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THE UNIVERSITY OF ALBERTA

SINISTRALITY, SOCIALIZATION AND AFFECTIVE DIFFERENTIATION

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Sinistrality, Socialization And Affective Differentiation

submitted by Randall John Robert Krausher

in partial fulfilment of the requirements for the degree of Master of Education.

Supervisor

E. E. Cox

John Young

Date June 27, 1977.

To my father, Walter Kraushaar (1913 - 1958)

ABSTRACT

This study attempted to determine whether left-handed and right-handed individuals could be found to differ in their personality organization on the basis of the concept of affective psychological differentiation.

Eighty-four undergraduate university males and females were tested. Subjects were assigned to one of four groups on the basis of sex and their scores on the Edinburgh Handedness Inventory. There were 22 left-handed females, 21 left-handed males, 21 right-handed males and 20 right-handed females.

A modified form of Jourard and Lasakow's Self-Disclosure Questionnaire was utilized to assess the extent of affective psychological differentiation. Additional personality measures, proposed as correlates of affective differentiation, included: self-acceptance (measured by Berger's Expressed Acceptance of Self Scale), extraversion and neuroticism (measured by the Eysenck Personality Inventory) and locus of control (measured by Rotter's I-E Scale). Additional data with regard to intelligence, age, birth position, family size, socioeconomic status and rural/urban residence was acquired.

Analysis of variance procedures were conducted on each of the main hypotheses. No significant differences were found to exist on any of the scales with regard to handedness, although significant sex differences were apparent in the extent of self-disclosure to others, female subjects scoring higher. Significant

interaction effects were obtained in the measures: locus of control, rural/urban residence and socioeconomic index.

Several possible explanations for the findings were hypothesized and discussed. In particular, issues were raised regarding the adequacy of self-disclosure as a viable measure of affective differentiation. The author concluded that further research is necessary to assess the impact that social class and differing parenting styles have upon the development of personality in the left-handed individual.

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CHAPTER I

INTRODUCTION

Introduction to the Study

The phenomenon of left-handedness in man has been evident from the beginnings of recorded history. "Sinistrals" (the scientific term denoting dominant left-handers) comprise a very small and unique segment of society, commonly considered approximately ten percent. The interest shown by scientists in this phenomenon has arisen, in part, due to a persistent and relatively unchanging proportion throughout several centuries.

The investigations of scientists and theoreticians have not led to a single, unitary theory of sinistrality. In fact, contained within the literature are many different causal explanations ranging from the rankest of conjecture to the most empirically and scientifically sound (Wile, 1934; Barsley, 1967; Gardner 1964; Burt, 1961; Herron, 1976).

Unfortunately, even today, scientists are not in full agreement regarding the genesis of hand preference. One commonly held view has been that left-handedness is pathological (Burt, 1961). That is, in view of the fact that 90 percent or more of society is right-handed, right-handedness is normative and proper; left-handedness therefore is a deviation from the norm. Operating from such a frame of reference, many researchers have tried to explain the factors which prevent sinistral individuals from developing normally into right-handers. Research in this past century with the mentally

retarded and the educationally disabled has done much to fuel the fires of these theoreticians, for frequently, a disproportionately large number of handicapped youngsters have displayed left-handedness. Inasmuch as these youngsters manifest some form of neurological dysfunction, the appearance of left-handedness has become associated as one of the more overt signs of brain damage (Burt, 1961; Bakan, 1971; Herron, 1976).

Today, the most cursory review of the literature reveals voluminous material which relates the manifestation of left-handedness to a variety of neurological anomalies. In view of this vast amount of research into the intellective and cognitive aspects of differing manual dominance, it is surprising to note the dearth of investigation in print dealing with the psychology of left-handedness. Yet an equally viable topic for investigation is the impact of being left-handed in a society designed and adapted for the right-handed majority.

Nature of the Study

It is the intent of this thesis to investigate whether sinistrals do differ psychologically and emotionally from their dextral counterparts. This study is undertaken for two reasons: firstly, as noted, examination into the psychology of left-handedness has been minimal; secondly, there are confusing and contradictory findings in the few studies that have appeared.

Overview of the Study

In Chapter II of this study, a review of the related literature provides evidence of the manner in which left-handedness has been defined historically, as a symbol of the impious and irreverent

blasphemer and psychologically, as a consequence of an aberrant personality. The ways in which many cultures and societies interpret sinistrality is discussed. It will be seen that a well-entrenched social and cultural bias exists against the use of the left hand even to the present day.

Chapter III presents a theoretical basis upon which left-handed persons might be expected to differ from right-handers as a consequence of differential socialization practices and Chapter IV provides five directional hypotheses which have been formulated to test the adaptive changes in the organization of personality that would be predicted as a result. Chapter V details the assessment procedures, the instruments utilized and the method of analysis of the data. Chapter VI presents the results of the research and Chapter VII is a discussion of the implications of these findings for the personality of the left-hander.

Limitations of the Study

This study, as originally designed proposed to set a precedent in research in this area by assessing both sinistrals and dextrals of both sexes across for four age groups, from lower elementary to adult. This was intended to reveal whether any differences would appear stable over time as well as from one sex to another. Unfortunately, the exigencies of time and financing have precluded such an investigation. Partially due to the availability of and accessibility to large groups, the study has been restricted to the university setting as being the most expedient.

CHAPTER II

RELATED LITERATURE

1. Organization and Overview

In the sections that follow, a report of the investigation into causal explanations of sinistrality is presented. The first details how historically, left-handedness has been viewed from Biblical times forward. The second reveals how scientists have attempted to account for the appearance of sinistrality as a psychological anomaly. In the concluding section, further evidence is presented which serves to demonstrate that the manifestation of left-handedness continues to be regarded in a negative context in many different societies.

2. Historical Interpretations of Left-Handedness

A. The Coming of the Bronze Age

Blau (1946), Hécaen and Ajuriaguerra (1964), Linksz (1973), Barsley (1967) and Gardner (1964), all make reference to this theory which proposes that, in Paleolithic times (roughly 100,000 years B.C.) a culture existed which was predominantly engaged in activities such as hunting, fishing and in the gathering of wild plants and berries. The stone tools used were simple and each individual is assumed to have used these tools at his convenience without any form of social convention. Men were assumed ambilateral, or able to use both hands equally well (or, equally clumsy). In Neolithic times, when stone knives began to appear, their construction revealed that the implements were intended for unilateral use, but no one consistent side was evident. The decision appears to have been based upon chance or

accident. With the coming of the Bronze Age (roughly 3,000 years B.C.) man learned how to smelt copper and to add tin to it to make bronze. The precision and complexity of the tools increased and, as tools came to be designed for use in one hand over the other, it became necessary for the owner of the tool to use it in the same way as its crafter had made it. Manual preference was born and it is presumed to have passed through the milennia by means of social rules and other customs.

B. Primitive Warfare Theory

Clark (1957), Gardner (1964), Barsley (1967) and Linksz (1973), note that Thomas Carlyle (1795 - 1881) is considered the father of this theory. Linksz' contemporary view regarding the genesis of hand preference can be traced directly back to Carlyle. Apparently Carlyle elaborated on this theory after contracting a disease in his right arm in his 75th year necessitating the enforced use of his left arm and hand. Essentially, Carlyle considered that the right hand was the hand of aggression. It was the hand that held the sword, stick or knife, while the left hand held a shield over the heart for protection. Right-handedness then predominated for the law of Natural Selection resulted in left-handers rapidly falling into the minority. That is, in that their shields left their hearts uncovered to aggressive attack, most became exterminated. Clark (1957) suggests that this theory is inadequate for an attack and injury to the liver (not protected in either warrior) might equally prove fatal. Later genetic studies which comprised the bulk of study into left-handedness have debunked this theory as being little more than an historic curiosity.

C. Plato and Aristotle

Plato considered man to be naturally ambilateral, but that faulty parenting caused one hand (the left) to lose its natural ability and to wither. Of this, Plato has written:

> In the use of the hand we are, as it were, maimed by the folly of nurses and mothers for although our several limbs are, by nature, balanced, we create a difference in them by habit (Plato, Book VII, Laws).

Handedness was unknowingly fostered in the infant by the manner in which the mother held it in her arms. For Plato, the mother was thought to hold the infant in her stronger arm--the right--and the child's right arm would be then free to exercise while the left was restricted against the mother's body. Blau (1946) notes that any close examination of mother-child behaviour reveals that right-handed mothers typically hold their infants in their left arms so that their more proficient right arms may tend to the child. This being so, if Plato's theory is assumed correct, then each second generation should be predominantly left-handed.

Aristotle, in contradistinction to Plato, maintained that preference for the right was a cosmic principle. For example, Aristotle referred to the preference of the crab to use the larger, more agile right pincer, and he saw, in the drawings of Early Man, a consistent preference for the right hand in their artwork, although Barsley (1967) would seriously challenge this last point today.

D. The Biblical View

Many authors including Clark (1957), Gardner (1964), Barsley (1967), Hécaen and Ajuriaguerra (1964) and Linksz (1973) make reference to the Israelite tribe of Benjamin who:

> were numbered at that time out of the cities twenty and six thousand men that drew sword....Among these people there were seven hundred chosen men left-handed; every one could sling stones at a hair's breadth, and not miss (Old Testament, Judges 20:15, 16).

Clark (1957) notes that in the Bible this is the first reference made to left-handed people. Some theorists propose that left-handed persons today are descended from the members of the tribe of Benjamin. The story of Ehud, a Benjamite warrior, and "a man left-handed" renowned among his people for his exploits on their behalf, is one of very few positive references made to left-handedness.

According to scripture, Ehud had been sent by God to free his people, the Benjamite tribe, from 18 years of enslavement at the hands of the Moab tribe. Ehud, requesting an audience with the King of Moab, carried a long sword strapped to his body beneath his clothing on the opposite side of the body that weapons were usually worn. As the story goes, because of this, the King's guards did not detect the weapon when Ehud was searched prior to his audience with the King. Ehud then saw the king, killed him (with his left-hand), escaped and subsequently led his people to victory and to freedom from the Moabs.

Elsewhere in the Bible, however, some 1600 references are made to the left-handedness (Barsley, 1967), each with a negative connotation. The right was associated with faith, goodness and lack of sin. The following words, taken from the Book of St. Matthew, Chapter XXV reveal:

> Then shall the King say unto them on his right hand, Come ye blessed of my Fathers, inherit the Kingdom prepared for you from the foundation of the world.

> Then shall he say also unto them on the left hand, Depart from me ye cursed into everlasting fire, prepared for the devil and his angels... and these shall go away into everlasting punishment; but the righteous into life eternal.

The belief that the right represents good, and the left, the evil, impure and sacreligious is seen not only in the Bible, but in the religious customs of many other groups. Robert Hertz (1960) wrote of the powerful social and religious sanctions placed against the left and the left-handed. His work will be elaborated in a later section.

E. Sunworship or Circumambulation Theory

For Wile (1934) man developed not only a preferred hand, but a preferred side. Sunworship, which is considered one of the earliest forms of worship in primitive man, involves an instinctual turning toward the source of light. As man's eyes traced the path of the sun through the sky from left to right, "man faced east, his anxious eyes following the sun through its course via the south to its glorious extinction in the west" (Wile, 1934, p. 143). Right movement came to be associated with sanctity and piety.

In Medieval times, circumambulation theory (or, the notion that the earth's rotation around the sun is in a clockwise--rightward--direction) was a deeply held belief especially among early Scots (Barsley, 1967).

> Motion or progress, in correspondence with the sun's apparent course is accounted natural--perhaps involving a religious act in following it with the gaze from below. But to move in the opposite direction, against the course of the sun, inferred respect for Satan, and became an attribute of necromancers (Barsley, 1967, p. 54).

Throughout history, many civilizations have viewed circling toward the right as a sacred ritual. The contemporary Buddhist's prayer wheel, the Wheel of Life, revolves from left to right in a clockwise motion, and the Turks, Muslims and Brahmans all have rigidly defined religious rites that specify some form of circling motion which, in a clockwise direction is sacred, in a counter-clockwise direction, blasphemous and evil.

Concluding how circumambulation associated the left with death, evil and other exclusively negative connotations, the Count of Goblet d'Alviella wrote:

> When the regular march of the sun was identified by circumambulation by the right, it was natural that the reverse of nature should be associated with the idea of malign influence and death or evil, like all the ceremonies of the Liturgy, when they are executed backwards....Here then, is a rite which, devised by our distant pre-historic ancestors is still celebrated before our eyes in official liturgies and in popular customs, after having passed through at least three successive religions. (Barsley, 1967, p. 58).

F. 'Vulgar Errors'

In 1648, an English doctor named Sir Thomas Browne, and a man reputedly 200 years before his time, published Enquiries Into Very Many Receiv'd Tenets and Commonly Presum'd TRUTHS which examined prove but VULGAR ERRORS. With regard to left-handedness, Sir Thomas resisted the superstitious sunworship theory prevalent at that time. He queried:

> What substance is there that in that auspicial principle and fundamental doctrine of Ariolation (fortune-telling) that the left hand is ominous and that good things do pass sinistrously upon us because the left-hand of man respected the right hand of the Gods, which handed their favors to us? (Barsley, 1967, p. 195).

For Browne, neither sunworship, nor what has today been termed

Primitive Warfare Theory made much sense. Rather, Browne preferred two quite radical explanations. The first was a Centre of Gravity principle (elaborated by Buchanan some 200 years later); the second was perhaps the earliest reference to a relationship between cerebral dominance and handedness.

G. Mechanical Law and Centre of Gravity Theories

Alexander Buchanan (1798 - 1882), professor of Physiology at the University of Glasgow, is associated with each of these theories. The Mechanical theory, first elaborated in 1862, held that when the child begins to use his limbs together, he immediately becomes 'aware' that there is a certain mechanical advantage possessed by the right side. Buchanan did not explain why this advantage came about, only that it led to a greater development of the muscles on the right side of the body. In 1877, a modified theory appeared which is termed the Centre of Gravity Theory. In this theory, it is held that within the organism, certain visceral organs are shifted to the right side of the body (liver, etc.) which essentially cause the person to "list" to the right side. In order to offset this imbalance the subject must lean more on his left foot for balance. The right foot was then considered to become the foot of motion. Subsequently, the right hand came into use more often because of this centre of gravity. In this way, footedness was thought to determine handedness. Left-handed

persons, according to the theory were those in whom the internal visceral organs had been transposed to the opposite inner side of the body. Ambidexterity was seen as the result when the centre of gravity was neither in the right nor the left. Anatomical findings have not confirmed Buchanan's theory. Left-handers do not have transposed viscera.

3. Psychological Theories

A group of "psychological" theories have characterized the left-handed individual as backward (Burt, 1961), mentally defective (Barsley, 1967), negativistic and rebellious (Blau, 1946), sickly and neurotic (Shields, 1962), "slightly schizophrenic" (Linksz, 1973) or criminally disposed (Lombroso, 1903). Each of these theories view left-handedness as a deviance from the norm, that being right-handedness. In consideration of the powerful influence of society favoring dextrality over sinistrality, why is it that some persons persist in remaining left-handed? Each of these authors, maintaining an environmentalist position, disregard the impact of genetic inheritance and subsequently look within the individual's personality to find the answer.

A. Burt

Sir Cyril Burt, an eminent professor of Psychology at the University of London, originally published a work entitled The Backward Child, in 1937. Burt's theory proposes that education and socialization will normally train all individuals to use the right hand. Burt asserts that right-handedness is the normal, well-adjusted type of reaction,

while left-handedness is a revolt against and completely at variance with the best interests of the individual since society is based upon right-handedness. Allowing no physiological basis for left-handedness, and dismissing any suggestion that some hereditary mechanism may be at work in its transmission, Burt's theory is a psycho-pathological explanation.

B. Blau

Abram Blau, professor of Psychiatry at New York University College of Medicine, considered that previous approaches to the subject of preferred laterality have been "segmental, isolated and static". Blau held that:

> it seems that out of our own special learnings, each investigator--educator, psychologist, psychiatrist, neurologist, geneticist--musters some strong facts to his side and evolves a theory that dovetails best with his chosen speciality. (Blau, 1946, p. 5)

Blau states, however, that there is no innate basis for laterality, rather that it is brought out by training and education. It is individually acquired and becomes an habitual response due to social conditioning. Sinistrality is considered to be the failure to acquire dextral habits (the normal learning process leads to right-handedness) and is formed on the basis of some handicap that interferes with the individual's adjustment to one or more of three essentials of the learning process. Thus three different types of sinistrality are possible:

1. Inherent Deficiency. There are those with physical defects and mental defects. Either of these defects can be congenital or the result

of some post-natal trauma. In the former group the subject has little choice but to become left-handed if the right is impaired. Earlier, Thomas Carlyle was noted as the originator of the Primitive Warfare Theory following the loss of use of his right arm at age 75. The latter grouping was created by Blau as studies which appeared after the turn of the century found that left-handedness was three to four times higher in schools for mental defectives than in schools for normals. Blau held that these latter individuals were more correctly termed "ambilateral" rather than left-handed for their limited mental powers prevented them from picking up the "generally direct and tacitly inherent" cues in the environment leading the infant to demonstrate right preference.

2. Faulty Education. Blau's second explanation can be described as a result of faulty education which holds that "sinistrality springs from either an absence of adequate educational opportunities or from a direct encouragement of sinistral tendencies" (1946, p. 89). Blau felt that modelling was important, for example, left-handed parents more often had left-handed children than right-handed parents. Also left-handed teachers had been reported as unconsciously influencing their students into the use of the left-hand. Next, Blau felt that parents had been misled by psychologists "of a genetic persuasion" who admonished parents not to force their children into right-handedness if they evidenced a preference for the left-hand, for there would be grave implications for twisted personality development otherwise:

> (These) authorities claimed that the child should be left free--as if this were possible--to choose the side for himself, so that the "instinctive dominance" would thus be allowed to emerge unadulterated by outside influence (Blau, 1946, p. 90).

Blau could not disagree more with these individuals, writing:

> In my opinion there is nothing progressive about this attitude. It is neglectful, harmful and has tended to counteract many of the normal cultural influences of dextrality. Many over-anxious parents put too high an estimate on the significance of the normal sinistral inclinations during infancy and go on to encourage sinistrality. Sinistral tendencies should really be discouraged and the child trained to adjust himself to this right-handed world. (1946, p. 90)

Related to the above point, Arthur Linksz (1973) maintained that by permissively allowing the child to develop left-hand preference, parents, rather than preventing personality problems, were unwittingly creating them for their children who became victimized by the social bias and prejudices against them. Barsley (1967) shares this opinion writing:

> to the left-hander, who has to grow up in this world and become accustomed to it, the prejudice is always present. The curious eyes which follow a left-hander as he writes in school or in a post office, or at a hotel desk, or when signing autographs, are unconsciously resenting the odd boy or odd man out (p. 1).

3. Negativism.

> This theory stated simply, is that sinistrality is the product of a contrary attitude on the part of the infant and young child. In other words, sinistrality is thus a symptom or manifestation of an attitude of opposition or negativism along with such other signs as disobedience, refusal to eat, temper tantrums, rebelliousness, etc. In place of a wish to comply with the social and cultural pressures toward the use of the right hand, there exists an active attitude of opposition or negativism which manifests itself in the development of sinistrality. It is though the child says, "Since you want me to use my right hand, I won't! I'll spite you by using my left!" (Blau, 1946, p. 91)

Why does the child become negativistic, vindictive and spiteful?

> Negative sinistrality may be explained as a part of an infantile psychoneurosis characterized by a reaction of contrariness which is a type of defiance against a restricting parent or due to other frustrations... many sinistrals ...(are) characterized by an association of negativistic features of a psychoanalytic anal and obsessive-compulsive character. Some of the outstanding features of this character type are obstinacy, inordinate cleanliness, parsimony, rigidity, a tendency to over-intellectualization, self-wilfullness, etc. (Blau, 1946, p. 122)

Assuming that individuals have both the mental and physical capacity to develop dextrality, only a psychological variable such as emotional negativism can account for persistent left-handedness according to Blau. Moreover, negativism neatly explained for Blau, why twice as many boys were left-handed as compared to girls.

> It is also well-known that boys have a much greater tendency than girls to take an oppositional and rebellious stand. This can be attributed to our cultural attitude which, in a child's very early years, expects and encourages more activity and aggressiveness from boys and more passivity and submissiveness from girls. (1946, p. 71)

Other writers support this position and state that girls being more "susceptible" to social conditioning evidence decreased left-handedness.

C. Linksz

Arthur Linksz (1973), like Blau, maintains that there is no innate manual superiority, but that social convention and custom teaches the child to become right-handed. For Linksz, however, the child does not become left-handed because of an intra-psychic "stubborn streak". Rather it is a result of faulty "too-permissive" education of parents who have been led to believe that interfering with "cerebral dominance"

will cause their child to become disoriented and confused, possibly becoming a stutterer and dyslexic child. Of this point, Gardner (1964) has written:

> Thirty or fourty years ago, parents were told by psychologists that all sorts of nervous disorders, especially stammering, might result if a left-handed child was taught to use his right hand for eating and writing. Not only would the changeover put a child in a state of emotional stress and rebellion, but (some authorities maintained) his brain would become confused as to which side was dominant, a confusion that would implicate the brain's speech centre. (p. 79)

Linksz maintains that what is termed "brain damage", "confused laterality", "faulty egocentric localization", "belated development of hemispheric dominance" in the left-handed child is "sheer induced schizophrenia". Linksz holds that parents should not permit the child to continue to use a hand which he continually hears is "not right". By mistakenly permitting the child to continue being left-handed, he becomes subject to discrimination because of his "handicap", he evidences a lowered self-concept and becomes a problem student as a result. Further, greater problems ensue if a child is permitted write left-handed than in forcing him to change. Linksz believes that teachers, in their ignorance, only amplify the problems that a left-hander experiences. If teachers are to successfully help the left-handed student's writing, they must be sufficiently trained to understand the kinds of problems a left-handed student encounters. Linksz concludes:

> we are not doing any prima facie harm or damage if we try to redirect a seemingly left-handed child's writing. We are doing a child an injustice if we let him develop into a left-hander if he shows only slight indications of left choice. We don't have to be so permissive. We do not have to be so guilt ridden.

> Our civilization is a civilization of the right hand, the aggressor hand, and we cannot change that. (Linksz, 1973, p. 183).

D. Lombroso

A variety of authors have related left-handedness to delinquent youth; normal, bright and dull neurotic children; epileptics; the insane, truant, incorrigible; mentally defective; psychopaths and psychotics (Burt, 1961; Blau, 1946; Gardner, 1964; Shields, 1962; Bakan, 1971). The notion of the left-handed as a rather scurrilous lot can be traced back to the 19th century theory espoused by Cesare Lombroso (1903). Lombroso, an Italian psychiatrist and noted criminologist was convinced that a higher proportion of left-handers were to be found in prisons than in the general population. He wrote extensively of his view that left-handedness was one of the more prominent degeneracy signs of the "born criminal". Gardner (1964), in summarizing Lombroso, classifies his theory pseudo-scientific, but curiously goes on to state:

> before parents developed permissiveness about left-handedness in children, there may have been many bitter conflicts between strongly left-handed youngsters and parents who tried to beat them into the use of their right hand. It is easy to understand how such conflicts might have led to difficulties that would predispose a person toward crime (p. 85).

4. Cultural Bias

Robert Hertz (1960) has carefully detailed the manner in which many different societies have defined concepts of left and right as a moral dualism. Hertz was perplexed as to why, in his time, 98 per cent of the population was right-handed and only two percent left-handed. For Hertz, a prime ingredient in the explanation of the

imbalance was a universal dualism or religious polarity. Dualism refers to "the one fundamental opposition (that) dominates the spiritual world of primitive men, that (being) between the sacred and the profane" (Hertz, 1960, p. 94). According to Hertz, all men, especially primitives, think in terms of these absolutes:

> Certain beings or objects by virtue of their nature or by the performance of rites are, as if it were impregnated with a special essence which consecrates them,sets them apart and bestows extraordinary powers on them, but which then subjects them to a set of rules and narrow restrictions (Hertz, 1960, p. 94).

Many examples from nature illustrate this fundamental dualism: light and dark; day and night; east and south in opposition to west and north; sky and earth; high and low; good and bad; right and wrong; strong and weak; active and passive; male and female. Embedded within this fundamental dualism are the religious and cultural connotations ascribed the right and left. Hertz can trace back in many societies that the right has come to represent the idea of sacred power:

> regular and beneficent, the principle of all effective activity, the source of everything that is good, favorable and legitimate; for the left, the ambiguous conception of the profane and the impure, the feeble and incapable which is also maleficent and dreaded (Hertz, 1960, p. 100).

The Maori for example, believe very strongly that the right side is the sacred side, the seat of good and creative powers and the side of "life and strength". The left conversely is the seat of the profane, possessing disturbing and suspect powers, the side of "death and weakness". For the Maori, the preponderance of the right hand is obligatory, imposed by coercion and guaranteed by sanctions. Contrarily, a powerful prohibition weighs on the left hand paralysing it. For this

society, children evidencing any independent left-handed activity have their left arm completely bound to teach them not to use it.

For the Northern American Indians, the right hand symbolizes bravery, power and virility. The left represents death, destruction and burial. The gods are on their right, so they turn to the right to pray. As Hertz illustrates from culture to culture, -- the Hindus, the Celts, the New Guinean tribes -- all can be seen to believe the left hand representative of clumsiness, as something to be despised and humiliated:

> whose domain is in a dark and ill-famed region...whose powers are occult and illegitimate, which inspires terror and repulsion....whose movements are suspect and corrupt....A left hand that is too gifted and agile is the sign of a nature contrary to right order of a perverse and devilish disposition: every person left-handed is a possible sorcerer, justly to be distrusted (Hertz, 1960, p. 106).

While many of today's industrialized societies no longer connote evil with sinistrality, many of today's customs reflect this heritage: the right hands are joined in marriage, the right hand takes the oath, concludes contracts, shakes and greets others, lends assistance, etc. In Western society, right means "correct". In Germany, recht means "law" and links means "awkward" and "left". In France, gauche means "crooked", "awkward" and "left" and carries a similar connotation in English. Droit in France means "right", "straight" and "righteous" as the word derecho does in Spain. Zurdas in Spanish refers to "leftward" and the "wrong way". In Italy, words referring to left are stanca (fatigued), manca (defective) and mancini (evil). Sinister in English, refers to "left" and "disastrous and evil" things. The Second Edition of Webster's New International Dictionary ties the preferred meaning of

sinister to the left hand and then moves on to:

> misleading or detrimental...malicious, prejudicial...wrong, as springing from indirection or obliquity; underhand; dishonest; corrupt...disastrous; injurious; evil; indicative of lurking evil or harm; boding covert danger...ominous.

A "left-handed compliment" is a sarcastic remark; "a daughter of the left hand" was once an illicit child; "to give the left hand in friendship" once meant to be hostile to another; "the left hand of fortune" today still refers to bad luck (Herron, 1976).

5. Current Research into the Left-handed Personality

As noted earlier, research into the psychology of left-handedness has been minimal. Unfortunately, the findings of the research that has been done conflict one with the other. The following is a selection of some of the studies that are now in print.

Young and Knapp (1966) became interested in the fact that left-handers seemed to suffer disadvantages in a world designed for right-handed persons. They noted that there would appear to be definite prejudices against sinistrals and cite that, in Italy, for example, were left-handedness incurs considerable disapproval, left-handed children are forced to write with their right-hands. In America, this type of overt coercion is not considered to occur. Young and Knapp therefore queried whether these differing childrearing practices would lead to measurable personality differences. The researchers tested Italian-immigrant schoolchildren and Italian-American school-children in Boston. They found that the Italian-American children whether left or right-handed, did not differ significantly in any of the measured personality characteristics. For the Italian immigrant

group however, the left and right handers did differ significantly. The sinistral youngsters were found to be more demanding, impatient, subjective, dependent, hypochondriacal, hypersensitive and self-preoccupied.

Finn and Neuringer (1968) attempted to evaluate the relationship between left-handedness and oppositional tendencies through the frequency of reference to the White Space (S) response on the Rorschach Inkblots. Reference to this white--or blank--space is considered by Rorschach (1951) to be a consistent and reliable indicator of negativism and oppositionally. Oppositionality has been defined as embracing the concepts: "contrariness", "stubbornness", "emotional resistence", "autonomousness" and "argumentativeness" (Stein, 1973). Finn and Neuringer (1968) tested 30 left-handed and right-handed undergraduate psychology males with the Rorschach and found that the left-handed subjects gave significantly more "S" responses than did the right-handed sample.

Domhoff (1969) a psychoanalyst, noted that many of his dysfunctional patients told stories wherein reference to the left was frequently made. They laid on their left sides while on the couch and had fantasies and dreams about injury or damage to the left sides of their bodies. Domhoff noted that Freud was well aware of the symbolism of the left and right (the left connoting femininity, passivity and weakness).

Interestingly, Domhoff found that as his clients improved in therapy they began to lay on their right sides more frequently while on the psychoanalytic couch, and references to the left in their fantasies and dreams ceased. Noting the clearly defined moral and religious dualism attached to right and left as seen in anthropological studies, Domhoff endeavoured

to determine whether "civilized America" maintained this belief. Administration of Osgood's Semantic Differential (Osgood, 1952) to 158 university undergraduate men and women revealed that the left is consistently regarded in a negative context. Domhoff concludes that the manifestation of left-handedness is symbolic of an unresolved Oedipal complex.

Etaugh (1972) assessed 89 male and female college students with Cattell's 16PF (Cattell, Saunders and Stice, 1950) to determine whether any personality correlates could be associated with left-handedness. Initially, 550 students were administered a 14-item paper-and-pencil handedness preference questionnaire developed by Crovitz and Zener (1962). Etaugh's results revealed that dominant left-handers, as identified by the handedness questionnaire, scored significantly higher in trust and significantly lower in intelligence, as measured by the 16PF's Factors L and B respectively. The value of her latter finding is equivocal however, in view of reports by Wittner (1971), Adock and Webberly (1971) and Bouchard (1972) who note that Cattell's Factor B does not correlate well with any other recognized tests of mental ability.

Arbet (1973) considered that strongly established laterality, whether right or left, was indicative of superior brain functioning when compared to ambilateral individuals. His research revealed that low-manuals were more anxious, mentally slower and more introverted than high manuals (either right or left). In addition, strongly pronounced left-handers were more easily frustrated and neurotic than strongly pronounced right-handers. Arbet accounts for this latter finding as the result of differential adaptation to the environment of right and left handers.

Kovac (1972) tested 85 male and female Czech university students with Eysenck's Personality Inventory (EPI) (Eysenck and Eysenck, 1968) and the Taylor Manifest Anxiety Scale (MAS) (Taylor, 1953). The left and right-handed subjects had initially been selected for assessment on the basis of Kovac's Overall Lateral Preference Test Kovac and Horkovic (1970a, 1970b). Both right and left-handed females were found to be significantly more neurotic and anxious than the males. And, as a total group, the left-handers were found to be more neurotic and anxious than the right-handers. Kovac and Brezina (1973) subsequently tested 578 male and female Slovak schoolchildren, ranging in age from 10 to 15 years. The administration of the Junior Eysenck Personality Inventory (JEPI) (Eysenck, 1963) and the Taylor Manifest Anxiety Scale (MAS) revealed neuroticism to be highest in strong left-handers and lowest in strong right-handers; anxiety to be highest in strong left-handers and lowest in strong right-handers. Both right and left-handed girls were found to be significantly higher in neuroticism and anxiety than any of the males.

Finally, Stein (1973) investigated whether left-handers could be differentiated from right-handers in their mode of adaptation to society and their physical environment based upon White's competence (White, 1959) and Shapiro's style (Shapiro, 1965). Stein identified 20 male left and right-handed volunteers on the basis of Harris' Tests of Lateral Dominance (Harris, 1958). He administered Gough's Adjective Checklist (Gough and Heilbrun, 1965) to assess self-concept, the Rorschach to test negativism and oppositionality and a modified Thematic Apperception Test (Murray, 1943) to assess whether left-handers

and right handers differ in their tendency to compensate for a physical defect. Multiple correlation analysis revealed that personality differences did exist between the two groups. On the self-concept measure, left-handers rated themselves significantly higher on autonomy than right-handers; on the negativism measure, left-handers scored significantly higher on two-thirds of the items; and right-handers were found to be significantly higher than left-handers in their tendency to compensate for a physical defect. Stein concluded that sinistrals experience more intense challenges to their competence and autonomy than dextrals and therefore respond with subtle adaptive and measurable personality changes. Stein considered that there may be more personality variables which may be incorporated into the left-handed personality style.

CHAPTER III

PSYCHOLOGICAL DIFFERENTIATION

Description

In 1948 Heinz Werner elaborated a theory of mental or cognitive development which has been termed differentiation. Heinz Werner recognized the strong influence on gestalt psychology in his "organismic-holistic" approach to cognitive development which necessitated an examination of the organism within its vital field or Umwelt. Unique to Werner's theory however, was that cognition was genetically determined, and secondly, that an important teleological aspect was evident. Werner, adapting Kantian philosophy, formulated his "orthogenetic principle" - a central theme to his theory. Here, it is considered that wherever a developmental progression occurs, it proceeds from a relative lack of differentiation to a state of increasing differentiation, articulation and hierarchic integration. As differentiation occurs, there is considered to be an ordering, grouping and centralization of activities which result in a decrease in independent parts of the system, hence an increasing subordination.

Werner considered differentiation to occur along five dimensions:

- from the syncretic to the discrete
- from the diffuse to the articulate
- from the indefinite to the definite
- from the rigid to the flexible
- from the labile to the stable

For Werner, cognitive functioning was thought to occur on qualitatively different yet functionally analogous levels (or processes). He set forth what he considered to be his main tasks:

- to grasp the characteristic patterns of each genetic level and the structure peculiar to it
- to establish the genetic relationship between these levels and the direction of development

He cautioned against viewing the former, or previous levels as incomplete forms of later cognitive functioning. For Werner, each level had a definite form and integrity at its own level. Each genetic level or analogous process was considered as permitting relationships with the Unwelten in one of the three ways:

1. Relationship on a sensori-motor level. At this level cognition is based upon an undifferentiated global type of awareness of relations only. Its mental activity is characterized by syncretic diffusion, synaesthesia, animism and magic.

2. Relationship on a perceptual level. Here, there is an awareness wherein the relation of two parts is based upon some aspect of concrete sameness or concrete difference.

3. Relationship on the level of conceptual abstraction. There are considered to be four substages ranging from a sensori-motor type to a truly complex and non-pictorial representation of some object or event. Language is considered to be an important element within this level.

For Werner, previous levels of mental functioning are not lost, but are contained within each succeeding level. This is an important aspect that Piaget, for example, does not make (Piaget, 1952). Figure I is a graphic representation of this principle.

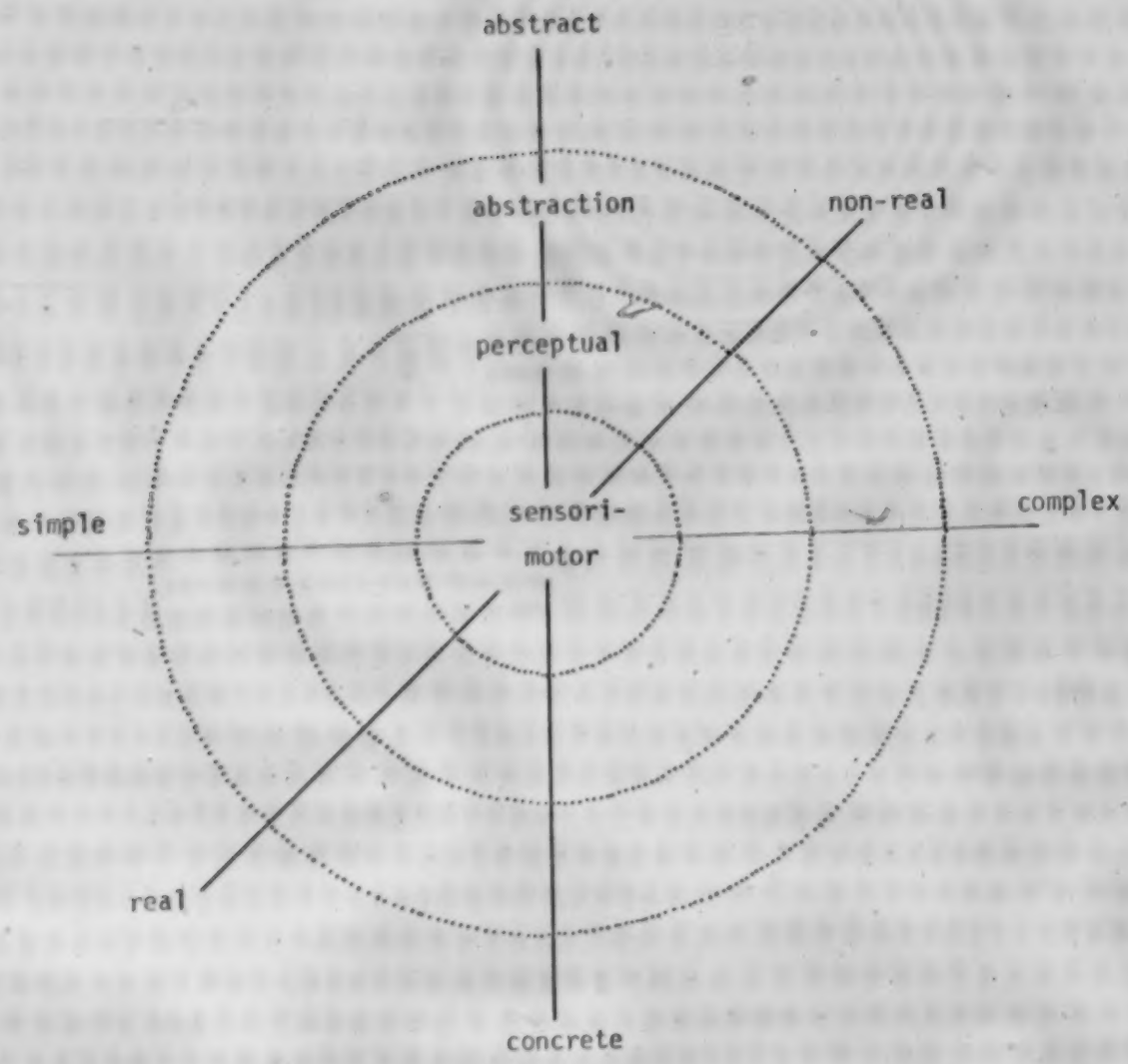

Figure 1

Dimensions of Psychological Differentiation

Differentiation as a Personality Construct

Werner's theory of differentiation has been used primarily within the perceptual-cognitive domain where it is commonly represented by the dimension of field-dependence/field-independence and referred to as one variety of cognitive style (Berry, 1974).

Witkin (1970a) notes however that there is a clearly evident applicability of the theory to the area of affective psychological functioning and even to social relationships. The research of Witkin, Lewis, Hertzman, Machover, Bretnall-Meissner, and Wapner (1954) and Witkin, Dyk, Faterson, Goodenough and Karp (1962) has identified three major characteristics of the highly differentiated individual:

1. Field-independence. Articulated versus global cognitive functioning. An articulated dimension of cognitive functioning is seen:

> in a field independent mode of perceiving where parts of the field are experienced as discrete from organized background (Witkin, et al, 1962, p. 114).

2. An articulated body concept. According to Witkin (1970a) body concept is the individual's systematic impression of his body's "cognitive and affective, conscious and unconscious" realms. Individuals with an articulated body concept are seen:

> to experience their bodies as having definite limits or boundaries and the parts within as discrete yet interrelated and formed into a definite structure (p. 199).

3. A sense of separate identity as reflected in more autonomous functioning. A "sense of separate identity" is considered an integral part of the notion of differentiation and implies a feeling of separateness from others and a minimal reliance on others for guidance and support (Berry, 1974).

> Persons with an articulated cognitive style give evidence of a developed sense of separate identity - that is to say, they have an awareness of needs, feelings, attributes which they recognize as their own and which they identify as distinct from those of others. 'Sense of separate identity' implies experience of the self as segregated. It also implies experience of the self as structured, internal frames of reference have been formed and are available as guides for a definition of the self. The less developed sense of separate identity of persons with a global cognitive style manifests itself in reliance on external sources for definition of their attitudes, judgements, sentiments and of their views of themselves (Berry, 1974, pp. 201-2).

For Berry, some of the main features of a 'sense of separate identity' include emphasis upon independence, control and reserve. For this reason Berry (1974) has utilized an inventory of self-disclosure adapted from Jourard (1971b). Berry (1974) and Berry and Annis (1974) consider this inventory to be a useful guage of socio-emotional differentiation. This measure has been used with several other accepted measures of cognitive-perceptual differentiation: Koh's Block Design Test (Koh, 1919), Raven's Progressive Matrices (Raven, 1960) and found to consistently correlate positively (Berry & Annis, 1974).

Witkin et al (1962), maintain that individual differences in cognitive style can be attributed to differences in the socialization practices. Further, an individual's cognitive style may be used to make inferences about the nature of the socialization utilized in the home during his rearing:

> a field-dependent cognitive style is likely to be predominant in social settings characterized by insistence upon adherence to family and social authority and the use of severe or even harsh socialization practices to enforce this conformance. (Witkin, Price-Williams, Bertini, Christiansen, Oltman, Ramirez and Van Meel, 1974, p. 16).

Whereas,

> encouragement of autonomous functioning as an emphasis in child rearing is associated with the development of a more field-independent cognitive style and greater differentiation...field dependence and limited differentiation tend to be associated with demand for adherence to parental authority (Witkin, et al, 1974, p. 13).

Witkin has summarized his thoughts on the main features of psychological differentiation writing:

> It is now our view that the characteristics which make up the contrasting constellations described may be conceived as diverse manifestations of more developed or less developed psychological differentiation. Thus, we consider it more differentiated if, in his perception of the world the person perceives parts of his field as discrete, and the field as structured. We consider it more differentiated if, in his concept of his body the person has a definite sense of the boundaries of the body and of the interrelation among its parts. We consider it more differentiated if the person has a feeling of himself as an individual distinct from others, and has internalized, developed standards to guide his view of the world and of himself. We consider it more differentiated if the defenses the person uses are specialized (Witkin, 1970a, pp. 206-7).

Relationship to Handedness

From the literature, it appears that the consistent and predominant use of the left hand over the right hand predisposes the individual to a cultural bias, and to ensuing differential societal and familial socialization experiences which his dextral counterparts do not share. From the writing of Witkin et al (1974) which relates socialization practices to psychological differentiation, it is anticipated that left-handers might develop a stronger sense of separate identity which can be a reflection of a higher level of psychological (socio-emotional or affective) differentiation. Witkin et al (1962), as the following passage reveals, have clearly identified the behavioural expectations

for individuals with a distinct sense of separate identity:

> In what observable ways may we expect a sense of separate identity to manifest itself? We have considered three categories of behavioural manifestations from which extent of development of a sense of separate identity may be inferred. First, we might anticipate that, on the basis of better developed inner frames of reference, a person with a developed sense of separate identity would be capable of functioning with relatively little need for guidance and support from others. In contrast, lack of developed sense of separate identity would foster a need for guidance from others in many situations. Second, within limits, we would expect a person with a more developed sense of separate identity to maintain more firmly his own direction in the face of contradicting attitudes, judgements, and values of others. In contrast, the person with a limited sense of separate identity, lacking developed frames of reference of his own, and so forced to use the attitudes, judgements and values of others to define his own, would be more susceptible to external influences and pressures. Third, we would expect a person with a well-developed sense of separate identity to have a relatively stable view of himself in varying social contexts, since he needs these contexts less for self-definition. In contrast, instability of self-view would be expected in persons with an underdeveloped sense of identity, precisely because their self-definition is more dependent upon these external contexts (Witkin, et al, 1962, pp. 134-5).

Summary Statement

Preceding sections of this work have endeavoured to present information which reveals that the manifestation of left-handedness has occasioned, throughout history, a negative cultural reaction. Cross-culturally in more primitive societies, it can be seen that left-manual preference is still deeply rooted in religious mysticism. Our culture is considered to still cling to a less overt form of bias against left-handedness. Rather than describing left-handedness as a harbinger of evil, frequently left-handedness is termed

"undesirable" as it is "awkward", "clumsy" or "unnatural".

Additionally, an attempt has been made to illustrate that socialization practices have a significant impact upon the incidence of left-handedness in any society, and that socialization practices have clear implications for the development of psychological (affective) differentiation.

It is held that the nature of our societies' attitude toward left-handedness will promote a greater sense of separate identity. That is to say that the left-handed individual will, in at least one way, define himself as possessing an attribute which differs from that of most others. This heightened sense of separate identity is considered to be a measure of greater affective differentiation. Moreover, following from the writings of Witkin, et al (1962), Berry (1974), a left-handed individual is expected to be more independent; reserved; controlled; secure; self-assured; with little need of guidance and support from others; more stable in his self-perception; more resolute in his decisions, values and judgements in the face of contradictory opinion.

CHAPTER IV

HYPOTHESES

Based upon argument presented in the literature, it is anticipated that left-handed individuals will be higher in affective differentiation than right-handed individuals. Hypotheses which follow the first are based upon the personality traits which are considered to be concomitants of affective differentiation.

Hypothesis Number I

It is hypothesized that left-handed individuals will score significantly lower in self-disclosure than right-handed individuals, as measured by a modified form of Jourard's self-disclosure inventory.

Measures of affective differentiation that have been utilized include the Figure Drawing Test (Witkin, 1970a, 1970b); an Asch-type conformity test (Berry, 1967); a modified self-disclosure inventory (Berry and Annis, 1974; Berry, 1974); Articulation of Body Concept (ABC) scale (Witkin, et al, 1974); and Machovers' (1949) Draw-A-Person Test (Witkin, 1970a).

Berry's (1974) and Berry & Annis' (1974) studies utilizing a modified self-disclosure inventory have reported that their self-disclosure measure has consistently correlated positively with other measures of cognitive-perceptual differentiation, such as the Embedded Figures Test (EFT) (Witkin, Oltman, Raskin & Karp, 1971).

A modified form of Jourard's (1971a) self-disclosure inventory has been selected for use in the present study. The scale has been used extensively with undergraduate university populations and the scale is seen as the most appropriate of those available.

Hypothesis Number 2

It is hypothesized that left-handed individuals will score significantly higher in self-acceptance than right-handed individuals, as measured by Berger's Acceptance of Self Inventory.

Following from studies by Gruenfeld and Weissenberg (1974), Witkin et al (1962), Stein (1973), it is anticipated that left-handed individuals should evidence a greater acceptance of self as a concomitant of heightened differentiation.

Berger's (1952) Acceptance of Self-And Others Inventory, has been examined and it is seen that the scale has been used with and normed upon college and university populations. It is sufficiently brief, self-administering and possesses adequate validity and reliability.

Hypothesis Number 3

It is hypothesized that left-handed individuals will score significantly lower in extraversion than right-handed individuals, as measured by the Eysenck Personality Inventory.

Research done by Crutchfield and Starkweather (1953), Witkin et al (1954; 1962), suggests that highly differentiated individuals are found to be "cold and distant with others", "unaware of social stimulus value", "value cognitive pursuits and are concerned with philosophical problems" (Crutchfield and Starkweather); "show distance from others and a lack of interest in and empathy for people" are "distant and aloof, showing a quality of emotional remoteness" (Witkin, et al, 1962).

In contrast, globally differentiated individuals are termed gregarious, affectionate, considerate, tactful, and socially outgoing (Witkin, et al, 1962). The studies of Berry (1974) and Berry and

Annis (1974) among others, confirm the behavioural descriptions attached to highly differentiated and limitedly differentiated persons.

Eysenck and Eysenck (1968) have described the high scoring individuals on the E (Extraversion) Scale of the Eysenck Personality Inventory (EPI) as "outgoing, impulsive, and uninhibited, having many social contacts and frequently positive participation in group activities" (Eysenck and Eysenck, 1968, p. 6).

The introvert is described as:

> a quiet sort or person, introspective, fond of books rather than people; he is reserved and distant except to intimate friends. He tends to plan ahead, "looks before he leaps", and distrusts the impulse of the moment. He does not like excitement, takes matters of everyday life with proper seriousness and likes a well-ordered mode of life. He keeps his feelings under close control, seldom behaves in an aggressive manner and does not lose his temper easily. He is reliable, somnolent, pessimistic and places great value on ethical standards (Eysenck and Eysenck, 1968, p. 6).

Considerable overlap is evident in the descriptions of extraverted and undifferentiated persons; introverts and highly differentiated persons. It is therefore proposed that the Eysenck Personality Inventory be employed as an additional measure of affective differentiation in the present study.

Hypothesis Number 4

It is hypothesized that left-handed individuals will score significantly lower in externality than right-handed individuals, as measured by Rotter's Locus of Control (I-E) Scale.

In 1966, Julian Rotter elaborated his theory which states that the extent to which reward of reinforcement influences the preceding behaviour depends upon whether the person perceives the reward as contingent upon his behaviour or independent of it. In concordance

with social learning theory, Rotter maintains that humans differ in the extent to which they feel that they are in control of the events that they experience in their lives. Moreover, Rotter contends that a variety of personality traits can be ascribed to those individuals who see themselves as primarily responsible for these life events, and those individuals who feel that they have no direct control of influence over their own destinies.

> When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then in our culture it is typically perceived as the result of lucky chance, fate, as under the control of powerful others or as unpredictable because of the great complexity of the forces surrounding him....We have labelled this a belief in external control....If the person perceives that the event is contingent upon his own behaviour or his own relatively permanent characteristics, we have termed this a belief in internal control (p. 1).

Rotter's research into internality and externality (I-E) or as it is more commonly referred, Locus of Control, has revealed that internals are: alert to their environment, skillful, achievement-oriented, resistant to subtle manipulation, surer of themselves, confident that they can control themselves and their destinies, place greater value on skill and achievement, are better educated, richer and more readily able to quit smoking.

Contrarily, externals are defined as docile, suspicious, feeling controlled and manipulated by the expectations of powerful others, make judgements on the basis of external contingencies, respect individual rights, and display a more liberating attitude in interpersonal relations (Rotter, 1966; Janzen and Beeken, 1973).

The type of person defined as an "internal" appears to possess

many of the attributes of a highly differentiated person, particularly with regard to resistance to manipulation or reliance upon external sources for definition of attitudes and judgements. In fact, studies conducted by Crowne and Liverant (1963), Strickland (1962) and Getter (1962) and Gore (1962) concur in their findings that high "internal" individuals are more resistant to influence from outside sources.

At the opposite pole, externally oriented persons would appear to share a number of attributes in common with global, undifferentiated persons, most notably in "outgoingness" and dependency and reliance upon the group, or external source of reference for definition of personal attitudes and beliefs.

Hypothesis Number 5

It is hypothesized that left-handed individuals will score significantly lower than right-handed individuals in neuroticism, as measured by the Eysenck Personality Inventory.

A final area that is considered worthy of investigation deals with emotional stability and instability. Although the concept of affective differentiation does not permit a specific directional inference about neuroticism for either differentiated or undifferentiated persons some logical reasoning will permit one to be made.

In the United States, Stein (1973) has found left-handers to display a higher level of self-acceptance than right-handers. Berry (1974) has considered that a high level of differentiation consistently correlates negatively with feelings of stress and marginality. Moreover, they are described as self-confident and surer of themselves. Inasmuch as self-concept and neuroticism appear to bear an inverse relationship, in the present study, it can be hypothesized that highly differentiated

individuals, also higher in self-concept, should be lower in neuroticism and emotional instability. Eysenck's Personality Inventory (EPI) contains an "N" (Neuroticism) scale which has been utilized in the present study to measure the extent to which left-handers and right-handers manifest emotional instability.

Summary of Hypotheses

A projected personality type can be made for both left-handed and right-handed individuals which combine the foregoing hypotheses.

For Left-Handers: It is anticipated that left-handers will demonstrate a stronger sense of separate identity which, as a manifestation of greater affective differentiation, can be measured by diminished willingness to disclose oneself to others, as well as in a lower extraversion score. Left-handers are expected to be higher in their acceptance of themselves, to feel confident in their capacity to control and to regulate the course and direction of their lives, and to display a greater level of emotional stability.

For Right-Handers: Dextrals, due to differential socialization practices, are not expected to establish as strong a sense of separate identity and therefore are anticipated to be lower in affective differentiation. They are expected to be more willing to reveal themselves to others, to be more outgoing and sociable, less likely to feel in control of their destinies, lower in acceptance of self and higher in emotional lability.

Table I summarizes each of the five main hypotheses.

TABLE I

LIST OF HYPOTHESES

Number	Hypothesis
1	- It is hypothesized that left-handed individuals will score significantly lower in self-disclosure than right-handed individuals, as measured by a modified form of Jourard's Self-Disclosure Inventory.
2	- It is hypothesized that left-handed individuals will score significantly higher in self-acceptance than right-handed individuals, as measured by Berger's Acceptance of Self Inventory.
3	- It is hypothesized that left-handed individuals will score significantly lower in extraversion than right-handed individuals, as measured by the Eysenck Personality Inventory.
4	- It is hypothesized that left-handed individuals will score significantly lower in externality than right-handed individuals, as measured by Rotter's Locus of Control (I-E) Scale.
5	- It is hypothesized that left-handed individuals will score significantly lower than right-handed individuals in neuroticism, as measured by the Eysenck Personality Inventory.

CHAPTER V

RESEARCH DESIGN AND METHODOLOGY

The Sample

The subjects for this study were drawn from a population of approximately 800 undergraduate students in four Educational Psychology classes at the University of Alberta in Edmonton, Alberta. Permission was gained from the instructors of the four classes to administer the Edinburgh Handedness Inventory at the beginning of each class.

Prior to the distribution of the questionnaire, each group of students was informed that the researcher wished to acquire data regarding the incidence of left and right-handedness in undergraduate populations and that some subjects would be contacted at a later date to participate in a more detailed research project. Students were then advised regarding the correct procedure in completing the questionnaire: to include first names only, age, sex and telephone number at which they could be contacted in Edmonton.

Each of the left-handed subjects' questionnaires was examined to assure that only those who had indicated exclusive left-preference in each of writing, drawing, throwing, cutting with scissors, and eating with a spoon would be included in the second phase of the study.

A total of 95 subjects were contacted by telephone between January 28 and 31, 1977, to request their participation in the second phase of the study.

Procedure In Administration

Eighty-four subjects (21 left-handed males, 22 left-handed females, 21 right-handed males and 20 right-handed females) were seen at the Counselling Centre, University of Alberta. All subjects were interviewed by the researcher and were placed into either a private testing cubicle or carrell to work undisturbed.

Each student was then given a test package. The Otis Mental Ability Test was timed for 20 minutes and then each subject was advised to work through each of the remaining inventories until completed.

Students initially completed the Personal Data Sheet, followed by the Otis Self-Administering Test of Mental Ability, the Locus of Control Scale, the Eysenck Personality Inventory, the Self-Acceptance Scale and the Self-Disclosure Inventory, in that order. Total time for completion of the test battery ranged from 45 minutes to 90 minutes, with a mean near 60 minutes.

Students were invited to return to the Counselling Centre to meet with the researcher within three weeks to discuss the results of the study if they so wished.

Instruments

The section that follows describes the instruments which have been selected for utilization in the test battery. In each instance, a rationale is presented for a test's inclusion. One feature common to all however, is that each has received extensive use within the university setting, for which norms are available.

The Edinburgh Handedness Inventory

There are considered to be two main approaches in quantitatively assessing manual dominance. The first is a motor-skill method where an individual performs a variety of unimanual actions, often novel in nature, with the right and the left hand. These tests are timed and an index of handedness is calculated based upon the degree of proficiency of one over the other.

A second approach is the self-report paper-and-pencil inventory wherein examinees indicate which hand is preferred in a variety of "habitual everyday acts". An index of handedness is calculated upon the extent to which an individual prefers to use one hand over the other in those activities sampled. Many inventories have appeared which follow the self-report method: Durost (1934); Hull (1936); Wittenborn (1946); Humphrey (1951); Annett (1967; 1970); Dusewizc and Kershner (1969); Harris (1958); Oldfield (1971); Provins and Cunliffe (1972a; 1972b); Kovac & Horkovic (1970a; 1970b); Crovitz and Zener (1962); Raczkowski & Kalat (1974). Of these, only Harris' (1958) Tests of Lateral Dominance, contain sections which test both proficiency and preference.

Oldfield (1971) suggests that motor skill tests are disadvantaged by the amount of time required in individual administration, as well as the biasing effects of age and sex.

He considers that paper-and-pencil inventories adequately discriminate between individuals who utilize different hands in everyday activities and he has shown that the distribution of handedness scores for motor-skill tests and self-report inventories differ markedly.

It is the central thesis of this study that a cultural bias is assumed to exist against the use of the left-hand and it is considered that individuals identifying themselves as left-hand dominant will be exposed to differential cultural and environmental experiences which will be reflected in differing and measurable personality characteristics. One confounding variable, however, is that a significant number of "left-leaning" persons do not identify themselves as left-handed but as right-handed. That is, lateral dominance test researchers consistently find that significant numbers of subjects will identify themselves as exclusively right-handed although objective test results reveal mixed handedness with a slight manual superiority of the left hand over the right. The work of researchers at the University of Alberta, confirms this finding (Annand, 1971; Irvine, 1972).

In view of this it is proposed that persons who meet the following criteria be selected for membership in a left-handedness test sample:

1. Readily identify themselves as left-hand dominant.
2. Are seen to reflect left-hand dominance in a variety of commonly publicly displayed activities such as writing, eating with a fork, throwing a ball, etc.

Members will be sought who comprise extreme and opposing ends of the handedness continuum. Utilization of motor-speeded tasks is considered unnecessary as it would identify not only left and right hand dominants but the many who fall between those extremes. Recognizing that there are members of this latter group who would identify themselves as only right-handed, their inclusion in the sample would only serve to introduce a confounding variable.

The Edinburgh Handedness Inventory, developed by Oldfield (1971) has been found to meet each of the following criteria:

1. Brief, easily administered to large groups at one time.
2. Displaying acceptable reliability.
3. Contains test items sampling a variety of frequently displayed unimanual activities (for example, using a knife versus using a tennis racquet).
4. Handedness based upon self-report rather than motor-speeded subtests.

The Edinburgh Handedness Inventory (EHI) (Appendix I) consists of ten items: writing, drawing, throwing, use of scissors, toothbrush, knife (without fork), spoon, broom (upper hand), striking a match and opening a box. Subjects are instructed to indicate the strength of their hand preference for each of the ten items by putting one or two 'ticks' in the appropriate column, or one tick in each column if both hands are used alternatively. The EHI provides a "Laterality Quotient" (LQ) which can range from +100 (Total Right-Handedness) to -100 (Total Left-Handedness). Tables 2 and 3 indicate conversion charts for transforming the Laterality Quotients into deciles (Oldfield, 1971, p. 109).

R. C. Oldfield developed the EHI by adapting 20 items from Humphrey's (1951) scale on handedness. Oldfield's items were administered to 1,128 male and female psychology undergraduate university students. Subsequent item analysis revealed that ten of the items could be dropped with no appreciable loss in accuracy. Oldfield states that the EHI is free of the biasing effects of sex, socio-economic status, and differing national and cultural backgrounds. Left-dominance was identified in 10% of Oldfield's male sample and in 5.92% of the female sample.

Table 2

Decile Values: Right

Edinburgh Handedness Inventory

Decile	L.Q.
1	48
2	60
3	68
4	74
5	80
6	84
7	88
8	92
9	95
10	100

Table 3

Decile Values: Left

Edinburgh Handedness Inventory

Decile	L.Q.
1	28
2	42
3	54
4	66
5	76
6	83
7	87
8	90
9	92
10	100

McMeekan and Lishman (1974), published a study which endeavoured to ascertain the test-retest reliability of the Edinburgh Handedness Inventory. Seventy-three subjects - 35 males and 38 females - ranging in age from 15 to 64 years were tested. The mean time elapsed between initial and representation was 14½ weeks (range 8 to 26 weeks). Reliability coefficients were calculated for two groups, those with Laterality Quotients ranging from 0 to +99 (right-handed) and -1 to -99 (left-handed). For the former group a reliability coefficient of .75 was established, and for the latter group .86.

Locus of Control

Rotter's locus of control concept has been researched in two main ways. In the first, an experimental situation is established which is so designed that the test subject will view the rewards offered as either directly contingent upon, or independent of his actions. Phares' color-matching experiment (Phares, Wilson and Klyver, 1971), is illustrative of this type of approach.

The second major way of assessing locus of control has been through the use of a 29-item forced-choice scale developed by Rotter in 1966 (Appendix 2). This scale is very brief (10 minutes), self-administering and has been used extensively in the university setting at the undergraduate level, with males and females. The test, which contains six filler items included to disguise the true intent of the test is scored to a maximum of 23. Scores toward the lower end are indicative of an internal orientation and scores approaching the higher end of the scale, suggestive of an external orientation.

The I-E scale, as it is termed, has been and continues to be widely researched. Rotter has published reliability studies which reveal that the reliability of the scale, when used with undergraduate university students has ranged from .65 to .76 when determined through an internal consistency method; and from .49 to .83 when a test/retest method was utilized.

The test, in its present form would appear to be suitable for inclusion in the present study as a measure of one's resistance to subtle manipulation and belief in one's ability to direct his own destiny (which may also be termed a highly differentiated personality type).

Eysenck Personality Inventory

The Eysenck Personality Inventory, (EPI) has been a very widely researched and well-accepted test document since its introduction in 1963. It is a modified form of the Maudsley Personality Inventory (MPI) (Eysenck, 1962) and it differs from the latter mainly in the addition of a Lie (L) scale. In its present form the EPI measures three constructs: Extraversion, Neuroticism and Lie. Extraversion has been defined as "the outgoing, uninhibited, impulsive, and sociable inclinations of a person", and neuroticism as "the general emotional over-responsiveness, and lability to neurotic breakdown under stress" (Eysenck and Eysenck, 1968, p. 5). These two dimensions are considered to be independent and empirically have been found to be so (Eysenck and Eysenck, 1968). Norms are available for undergraduate university students, both male and female. Eysenck and Eysenck (1968) report that the EPI possesses test/retest reliability of .85 "even after

periods of several months" (p. 5). Correlations of the test with sex, age, social class and rural-urban residence have been found to be nonsignificant.

The factorial validity of the EPI has been empirically demonstrated by Bendig (1960) whose analysis of the earlier Maudsley Personality Inventory (MPI) revealed two factors which he termed "introversion-extraversion" and "emotionality". Factor loadings of from .64 to .78 are noted for the MPI neuroticism scale, and from .78 to .79 for the MPI extraversion scale.

The concurrent validity of the EPI has been established through correlations with several other personality measures which have revealed correlation coefficients of .74 for the IPAT Anxiety Scale (Cattell and Scheier, 1957) and Eysencks' 'N' scale; -.57 between Neuroticism and the 'Time Competence' subscale of Shostrum's (1963) Personal Orientation Inventory (POI); .39 between Extraversion and the POI's 'Spontaneity' scale. Both the E and N scales have been found to correlate significantly with several of the subscales of Gough's (1957) California Psychological Inventory (CPI); and Meehl's (1948) Minnesota Multiphasic Personality Inventory (MMPI) (Eysenck and Eysenck, 1968).

The EPI has been selected for use in the present study due to the overlap of personality traits as noted earlier, as well as the finding that Kovac (1972), and Kovac and Brezina (1973) have used the scale and its downward scaled version the Junior Eysenck Personality Inventory (JEPI) (Eysenck, 1963), successfully with left and right-handed Czech populations.

Acceptance of Self Scale

Berger's (1952) Self-Acceptance Scale originally appeared as a combination of two forms: Expressed Acceptance of Self and Expressed Acceptance of Others. Acceptance of Self is composed of 36 items, and Acceptance of Others of 28 items which have been combined into one 64 item test of approximately 30 minutes. Each of the items is responded to by selecting one of five Likert-type responses.

In the present study, the 36 item Expressed Acceptance of Self Scale has been selected (Appendix 3). Berger has defined self-acceptance based upon the extensive work done by Scheerer (1949). The self-accepting person is defined as:

1. Relying primarily upon internalized values and standards, rather than on external pressure as a guide for behaviour.
2. Has faith in his capacity to cope with life.
3. Assumes responsibility for and accepts the consequences of his own behaviour.
4. Accepts praise or criticism from others objectively.
5. Does not attempt to deny or distort any feelings, motives, limitations, abilities or favourable qualities which he sees in himself, but rather accepts all without self-condemnation.
6. Considers himself a person of worth on an equal plane with others.
7. Does not expect others to reject him whether he gives them any reason to reject him or not.
8. Does not regard himself as totally different from others, "queer" or generally abnormal in his reactions.
9. Is not shy or self-conscious (Berger, 1952, pp. 778-9).

Thus, the self-accepting person can be considered to possess attributes which have been ascribed to those individuals who have also been termed highly differentiated.

Berger initially prepared the scale with 47 items on self-acceptance which would be used in conjunction with a scale measuring acceptance of others. These scales were administered to 200 first year students in psychology and sociology, aged 17 to 45 years. Following an item analysis of the top 25 percent and bottom 25 percent, 36 items were selected which possessed the best discriminating power. Norms are available for university undergraduates; the test requires less than 20 minutes to complete.

The reliability of the Acceptance of Self Scale has been established by computing matched-half reliabilities and utilizing the Spearman-Brown formula to estimate whole-test reliability. These estimates were .894 or greater for the Self-Acceptance Scale, except for one group for which it was .746 (Berger, 1952).

The validity of the self-acceptance measure was established by having twenty subjects write essays about themselves which were then scored by four judges. An average statistically significant intercorrelation on the Self- Acceptance Scale and the essay ratings was .897 (Berger, 1952).

Self-Disclosure Inventory

The Self-Disclosure Questionnaire exists in a variety of forms at present (Jourard, 1971b). As noted earlier, studies by Berry (1971; 1974) and Berry and Annis (1974), have utilized a modified form of Jourard's (1971a) self-disclosure questionnaire as a measure of affective and emotional differentiation. The Self-Disclosure Questionnaire as designed for North American university populations, initially appeared as a 60-item self-administering paper-and-pencil

test which requested the examinee to indicate the extent to which he had discussed and revealed to specified others (mother, father, male friend, female friend) certain personal information in each of six areas: Attitudes and Opinions, Tastes and Interests, Work (or studies), Money, Personality, and Body (Jourard and Lasakow, 1958). The Self-Disclosure Inventory does not require that the test subject reveal personal information on these topics, rather, the extent to which he has revealed this to others. Appendix 4 presents the Jourard scale in its modified form for the present study.

Jourard and Lasakow (1958) first administered the 60-item inventory to 70 unmarried white college students of both sexes. The responses of each examinee were divided into halves and the reliability of the inventory established through an odd-even method. A reliability coefficient of .94 indicated that the examinees were responding consistently to the questionnaire over all target persons and all aspects of the self. Jourard and Lasakow conclude that the Self-Disclosure Questionnaire is "a reliable questionnaire for the assessment of self-disclosure" (1958, p. 98).

Otis Self-Administering Test of Mental Ability-Higher Examination

The Otis Self-Administering Test of Mental Ability-Higher Examination (Otis, 1956) is designed for high school students and college freshmen. It is issued in four alternative forms A, B, C, D, all of which are alike except for content. There are a total of 75 items on the test which are of multiple choice and are designed to sample both verbal and mathematical reasoning. The 'Higher Examination' can be

administered in two ways: a 20 minute time limit or a 30 minute time limit. Scores of a 20 minute version can be converted into a 30 minute equivalent.

One special feature of the test is that it is completely self-administering. All instructions are listed on the front page, and the examinee responds to each question in order, without interruption, until examination time has expired.

The Otis Self-Administering Test- Higher Examination has been normed on 2,516 students from 21 colleges and universities in the United States. Ten of the 21 schools used the 20 minute time limit which was then pro-rated into the 30 minute version.

Otis reports that the test reliability for parallel forms of the test (Forms A and B) to average .921. Otis has set the mean to be 100 and standard deviation of 12 where 50 percent of the scores fall within $\pm$ 1 standard deviation. Otis does not provide direct cross-validation studies of his test with other measures of intelligence, but cites research which indicates that the Otis Self-Administering Tests correlate from .55 to .59 with "scholarship". In Kuder's (1960) review of the Self-Administering Test, he states that the Higher Examination correlates as high or higher with college grades than does the American Council on Education Psychological Examination.

Personal Data Sheet

The acquisition of additional "control data" was made through the inclusion of a personal information sheet which examinees filled out prior to beginning the test battery (Appendix 5). The information sheet requests the examinee to state sex, age, major geographic

residence (in terms of population size of the closest urban centre), occupation of the head of the household as well as the number of older and younger siblings.

An attempt was made to assure anonymity by instructing each examinee on the personal information sheet, to only indicate a first name and to devise a four digit identification code to be written at the top of each test page. A precedent for the use of the code was provided by Scott and Johnson (1972) and Stein (1973).

Moderator Variables

It has been necessary to consider and to control for, those variables which have been found in past to influence personality and affective differentiation. In the present study, data has been secured for each of the following which will permit a more meaningful interpretation of the variables under experimentation.

Age

An attempt has been made to select test subjects who cluster closely in age. The mediating role that age plays in the development of personality has been revealed in the studies of Jourard and Lasakow (1958) and Eysenck and Eysenck (1968). Jourard and Lasakow's research has indicated that marital affiliation as well as advancing age affect the distribution of scores on the Self-Disclosure Questionnaire. The Eysencks have shown that both Extraversion and Neuroticism tend to decline with advancing age.

Inasmuch as age has been shown to correlate with three of the measures to be utilized in the present study, a decision has been made

to select test subjects who approximate university entering age (19 - 20), still reside within their parents' homes and are presumed to be unmarried (although no actual data was obtained for this latter item).

Intelligence

Corah (1965) conducted research into the psychological differentiation of male and female parents and their offspring. His findings revealed that psychological differentiation was significantly and positively correlated with intelligence in 120 adult males and females. In light of this finding, Corah has noted:

> Consequently, it would appear that inclusion of a measure of verbal intelligence is warranted in studies of differentiation so that its effects may be assessed and controlled (1965, p. 217).

In the present study, Otis' (1956) Self Administering Test of Mental Ability - Higher Examination has been selected to form part of the test battery. It has been chosen as the most suitable test available which meets each of the following criteria:

(i) comparatively brief

(ii) self-administering

(iii) possessing adequate reliability and validity

(iv) normed upon university undergraduate populations

Sex

A novel feature of this study has been the decision to include females in the test sample. No directly relevant studies pertaining to left and right-handed females as compared to their male counterparts

has been uncovered. However, based upon Jourard and Lasakow's work (1958), it is known that females have been shown to display more willingness to disclose personal information about themselves to specified others than do males.

Birth Position

According to Adler (1964) and Dreikurs and Soltz (1964), special traits can be ascribed to the offspring in any family, based upon the birth position within the family constellation. First, second, and later born children are found to differ in consistent and predictable ways as a consequence of the nature of the interaction with parents and with one another, which for each, is unique.

Konig (1963) and McArthur (1956) consider the first born child to have stronger neurotic tendencies than laterborns; they may be shy and fearful and involvement with and approval of adults is a central theme.

Second-born children enter a family "system" where it is evident that there is an elder, more competent sibling with which to compete. The second-born child seems to strive for recognition through unique and often novel avenues as compared to the first-born child (Robertson, 1976). Birth position within the family has consistently been found to relate to personality characteristics. In the study, data regarding birth position has been obtained by requesting each examinee to indicate the number of older siblings, and the number of younger siblings. In this way, information is obtained with regard to family size as well as ordinal position.

Rural/Urban Residence

Information regarding the nature of each subject's background, with regard to rural or urban residence has been requested, as the university community is known to draw from both small rural areas as well as large urban centres. To assure that each of the groups are comparable with regard to rural/urban upbringing and to identify possibly relationships presumed to exist between rural/urban residence, socioeconomic status, family size and birth position (Schachter, 1959), each respondent has been asked to identify the population size of their principal residence during their upbringing. Provision has been made to respond to one of four choices: population less than 5,000; population 5,000-50,000; population 50,000-100,000; population 100,000 +. For computer analysis purposes, numerical values ranging from 1 to 4 have been assigned to each category.

Socioeconomic Index

Christopher Bakare (1974) has found a relationship between social class, socialization practices and incidence of left-handedness. More specifically, his research has revealed that left-handedness is more prevalent in middle-class families where "relatively relaxed" socialization practices are found to occur. In contrast, he has shown that children of working class families being products of more severe socialization practices, rarely manifest left-handedness. Recognizing the heterogeneous backgrounds of university students, both geographically and socioeconomically it has been necessary to acquire data to control for a significant difference between groups in either of these areas.

Differential socialization practices have implications for the development of affective differentiation and subsequently, upon personality characteristics.

In this study, socioeconomic status is assigned a numerical value, based upon the work of Blishen (1967). The Blishen Socio-Economic Index was constructed from information obtained from the 1961 Canadian census. It is a rank ordering of 320 occupations according to social status. Each occupation is assigned a socio-economic index score based upon the income and education pertaining to each occupation. For a family, the socio-economic index score is based upon the highest ranking parental occupation.

Table 4 presents each of the instruments selected for use in the present study and their corresponding scales.

Analysis of the Data

Descriptive statistics were obtained for the total group with means and standard deviations for each of the scales calculated, as well as intercorrelations among all measures. T-tests were conducted on each of the measures to determine whether the four groups could be collapsed into two, differentiated only be handedness. One-way anlyses of variance were conducted for each of the variables found not to differ significantly by sex. Two-way analyses of variance (sex by handedness) were calculated for each of the variables where a significant sex difference was found to exist.

The results of the analyses of variance are discussed separately for each of the major hypotheses under examination.

TABLE 4

LIST OF ALL INSTRUMENTS AND THEIR CORRESPONDING SCALES

Instrument	Test Scale
Edinburgh Handedness Inventory	1. Measures the strength of preference of one hand over the other in 10 unimanual tasks.
Jourard Self-Disclosure Questionnaire	2. Measures the extent to which the subject has disclosed certain personal information to specified others.
Rotter Locus of Control Scale	3. Measure of internality/ externality.
Berger Acceptance of Self Scale	4. Measures self-acceptance.
Eysenck Personality Inventory	5. Measures Introversion/Extraversion and Neuroticism.
Otis Self-Administering Test of Mental Ability - Higher Examination	6. Measure of intelligence.
Personal Data Sheet	7. Age
	8. Sex
	9. Rural/Urban Residence
	10. Birth Position
	11. Family Size
	12. Socio-economic Index

CHAPTER VI

RESULTS

Descriptive Statistics For Left And Right Handers

Handedness was determined through a manual preference, rather than proficiency, method. The Edinburgh Handedness Inventory was utilized for this purpose. For the sample of 84 subjects, scores ranged from -100 to +100. The mean and standard deviation for the left-handed group of 43 subjects was -70.07 and -23.61; for the right-handed group of 41 subjects, a mean and standard deviation of +99.76 and +1.56 were recorded respectively. The proportion of exclusively left-handed individuals in the sinistral population is much less than that apparent in the dextral population as a whole. This finding has been attributed to the accommodations that many left-handers make in a world which is designed for the majority of right-handers (Oldfield, 1971; Stein, 1973).

Table 5 details the percentages of left-handed and right-handed males and females which were obtained in the present study. Table 6 presents comparable data from Oldfield's (1971) study on the EHI.

The similarity in the proportion of males to females and of left-handers to right-handers in the present study, and in Oldfield's 1971 study, conducted in the United Kingdom, is evident. Female students are seen to over-represent males in each sample by a ratio of 2:1 whereas the males outnumber the females in their membership in the left-handedness group by a ratio of 2:1. As Table 5 reveals, in this present study, 53 out of 715 test subjects (or, 7.41 percent) were predominantly left-handed.

TABLE 5

Percentages of Subjects Completing the EHI by Handedness and Sex

(N=715)

	Laterality Quotient (L.Q.)		
	+ (Right)	- (Left)	
Males	227	26(10.27%)	253
Females	435	27(5.84%)	462
Total	662	53(7.41%)	715

TABLE 6

Percentages of Subjects Completing the EHI, in Oldfield's (1971) Study, by Handedness and Sex

(N=1,109)

	Laterality Quotient (L.Q.)		
	+ (Right)	- (Left)	
Males	360	40(10.0%)	400
Females	667	42(5.92%)	709
Total	1027	82(7.39%)	1109

Figures 2 and 3 represent graphic illustrations of sex differences in the distribution of laterality quotients transformed into decile equivalents. Figure 2 presents data from the present study. Figure 3 presents data obtained from Oldfield (1971).

Apparent in the bar graphs is the finding that women, moreso than men, comprise a more homogeneous group with respect to handedness preference, whether left or right-handed. That is, a greater proportion of right-handed females are exclusively right-handed as compared to males; and a greater proportion of left-handed females are exclusively left-handed as compared to their male counterparts. The greater incidence of mixed handedness in the male population as a whole may be a result of their greater involvement in sports and other skill-oriented manual activities in which past experience has proven that one hand may be more adroit for a given activity than the other, more frequently used hand.

Figure 4 presents the cumulative percentage distribution for both sexes obtained in the present study. Oldfield's data is included in Figure 5 for comparison. Again, it is apparent that there is more homogeneity among right-handers in manual activities than in left-handers.

Table 7 lists the means and standard deviations for the total group of 84 subjects and for both left-handed and right-handed subgroups.

Table 8 represents the intercorrelations among each of 18 variables under examination in the present study. In this table, Variable 1 (Strength of Handedness) is seen to possess very low correlations,

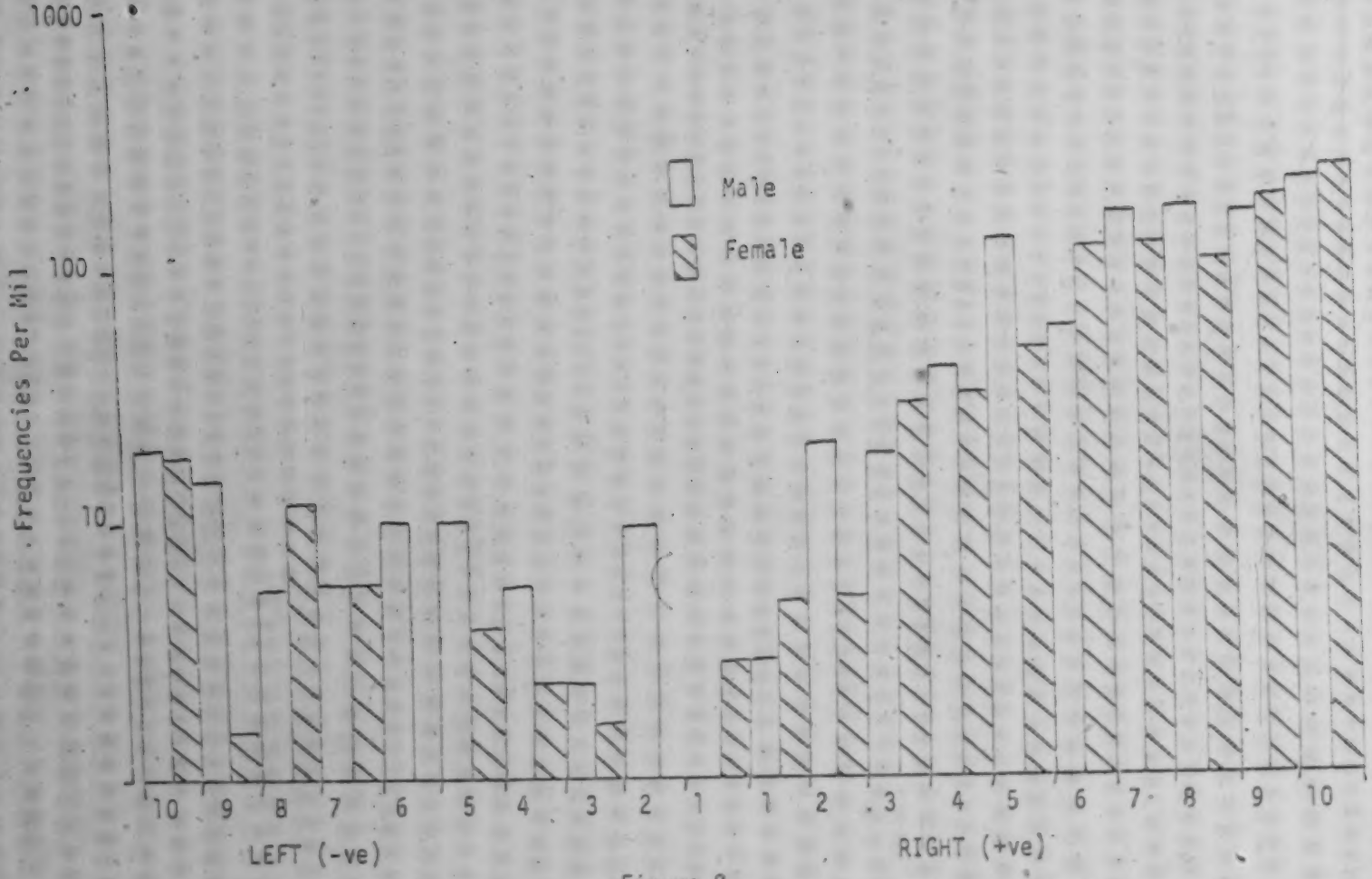

Figure 2

LATERALITY QUOTIENT RANGES

Sex Differences in the Distribution of Laterality Quotients: Present Study

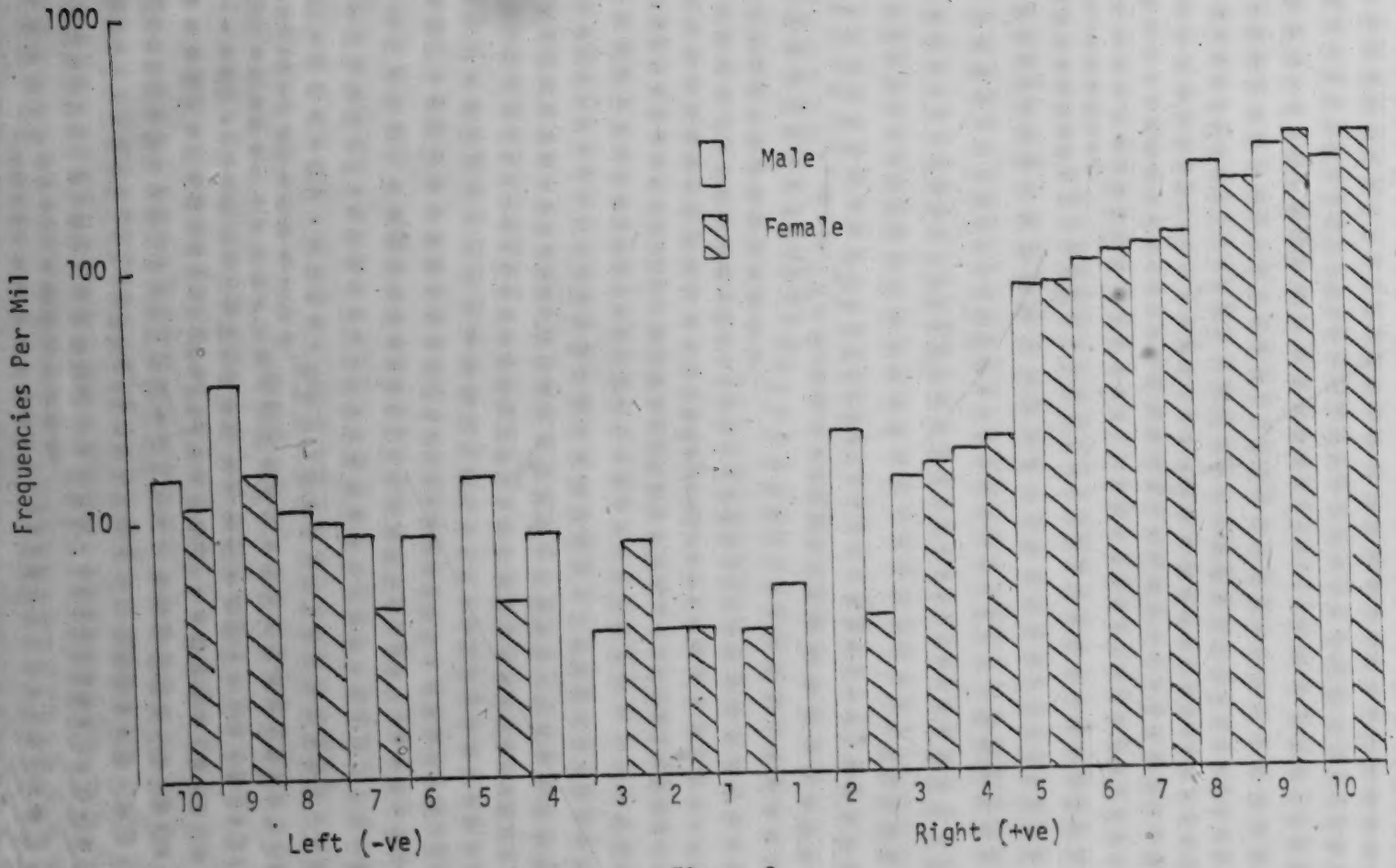

Figure 3

LATERALITY QUOTIENT RANGES

Sex Differences in the Distribution of Laterality Quotients: Oldfield Study

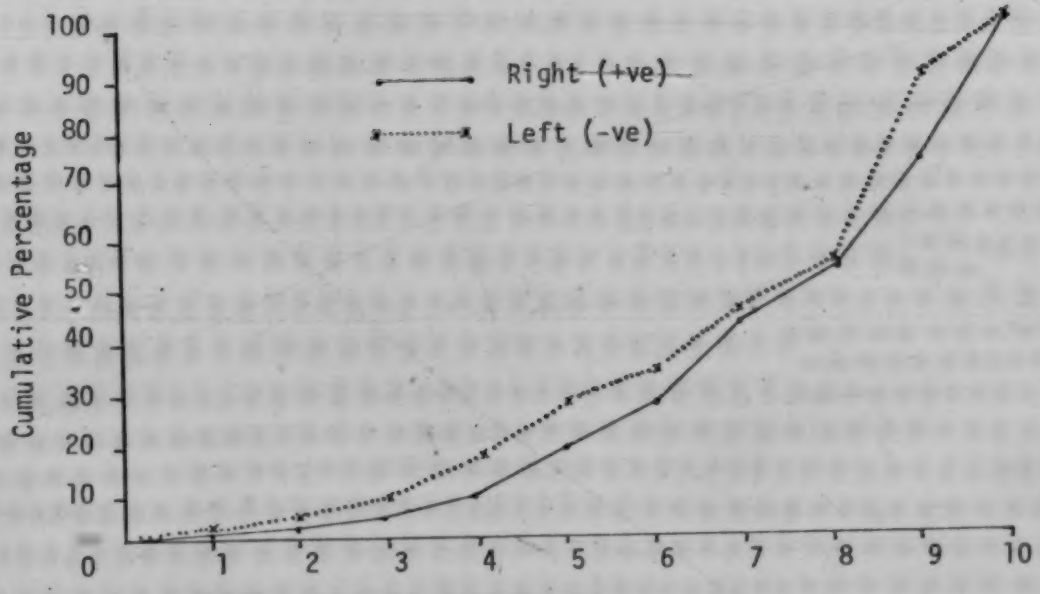

Figure 4

LATERALITY QUOTIENT RANGES

Cumulative Percentage Distributions For Both Sexes: Present Study

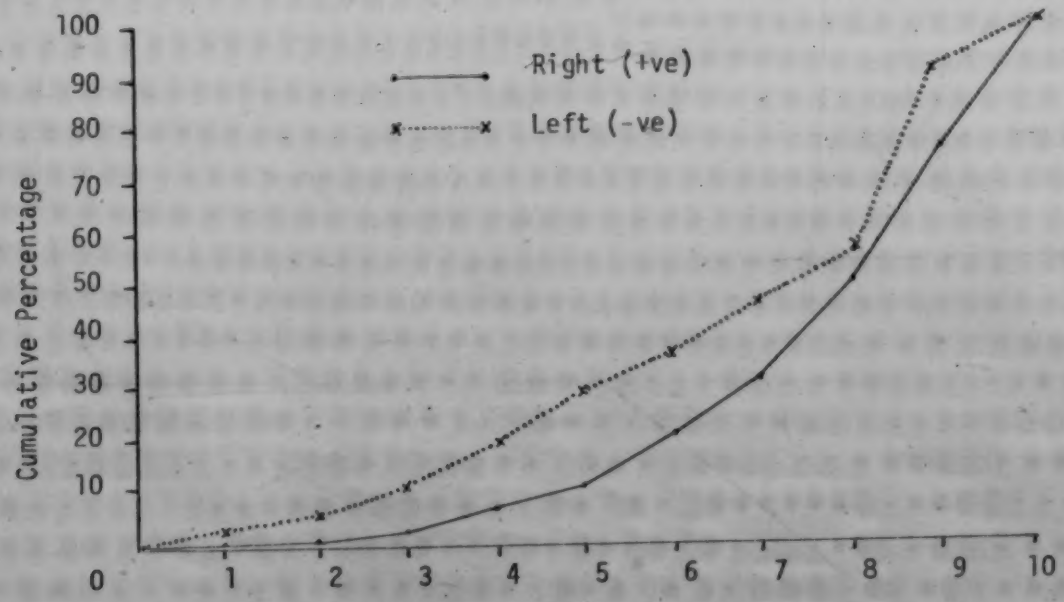

Figure 5

LATERALITY QUOTIENT RANGES

Cumulative Percentage Distributions For Both Sexes: Oldfield Study

TABLE 7

Means and Standard Deviations for Left-Handed and Right-Handed Subjects

Variable	Left-Handers (N=43)	Right-Handers (N=41)	Total Sample (N=84)
Age	20.28(2.43)[a]	20.07(1.89)	20.17(2.16)
Rural/Urban (b) Residence	2.74(1.42)	2.68(1.35)	2.71(1.36)
Socioeconomic (c) Index	51.58(16.44)	54.59(14.88)	53.04(15.58)
I.Q.	117.5 (8.3)	116.2 (8.3)	116.9 (8.2)
Birth Position	2.53(1.01)	2.27(1.14)	2.40(1.07)
Family Size	3.93(2.22)	3.98(2.03)	3.95(2.10)
Locus of Control	10.09(4.20)	11.07(4.16)	10.57(4.15)
Extraversion	12.33(3.71)	12.51(3.39)	12.41(3.51)
Neuroticism	11.28(3.95)	11.05(4.70)	11.16(4.28)
Lie Scale	3.26(1.53)	3.02(1.47)	3.14(1.48)
Self-Acceptance	145.44(16.20)	141.95(18.07)	143.73(17.02)
Self-Disclosure: Mother	19.58(10.04)	19.54(8.10)	19.55(9.03)
Self-Disclosure: Father	15.05(7.63)	14.51(7.10)	14.78(7.28)
Self-Disclosure: Male Peer	22.74(9.06)	23.20(8.00)	22.96(8.45)
Self-Disclosure: Female Peer	25.05(7.94)	26.63(8.23)	25.82(8.02)
Self-Disclosure: Total	80.40(27.16)	81.07(24.39)	80.72(25.53)

a Numbers in brackets list standard deviations.

b Scores ranging from 1 to 4 have been assigned to rural/urban residence: 1= < 5,000 pop'n; 2= 5,000-50,000; 3= 50,000-100,000; 4= 100,000 + population.

c Based upon Blishen's (1967) rating system.

TABLE 8

Intercorrelations Among Eighteen Variables Under Examination

Variable	1	2	3	4	5	6	7
1. Handedness	1.00						
2. Sex	-029*	1.00					
3. Age	-016	-138	1.00				
4. Rural/Urban Residence	-047	-122	-007	1.00			
5. Birth Position	-118	000	-088	-141	1.00		
6. Family Size	037	-057	033	-245	474	1.00	
7. Socioeconomic Index	092	-159	058	507	-185	-201	1.00
8. I.Q.	-137	-121	116	227	-253	-173	121
9. Locus of Control	117	120	035	025	-023	-095	069
10. Extraversion	-027	017	-060	111	-143	-110	024
11. Neuroticism	017	089	020	-014	-061	014	060
12. Lie Scale	-086	-096	-001	020	091	181	-077
13. Self-Acceptance	-113	091	117	-051	-042	-104	-046
14. Self-Disclosure (Mother)	003	381	-008	-004	-044	-086	-060
15. Self-Disclosure (Father)	-040	078	157	074	-112	-175	118
16. Self-Disclosure (Male Peer)	028	162	147	-102	-123	-029	-021
17. Self-Disclosure (Female Peer)	086	366	-082	140	-111	-189	043
18. Self-Disclosure (Total)	006	310	057	039	-118	-145	034

* All decimal points omitted except in diagonal

TABLE 8

(Continued)

Variable	8	9	10	11	12	13	14	15	16	17	18
8	1.00										
9	-017	1.00									
10	-113	096	1.00								
11	-087	378	004	1.00							
12	111	-246	-118	-368	1.00						
13	008	-339	111	-634	181	1.00					
14	-225	-034	182	-089	137	287	1.00				
15	-234	-169	311	-096	126	282	644	1.00			
16	023	-012	166	013	-076	177	414	268	1.00		
17	-207	045	307	100	-137	104	506	422	473	1.00	
18	-212	-054	313	-018	022	266	848	751	697	759	1.00

many clustering near zero, with each of the other variables. High inter-correlations were evident between the subscales: Mother; Father; Male Peer; Female Peer of the Self-Disclosure Inventory and suggests that persons who are willing to be self-revealing to at least on other, also tend to generally reveal more of themselves to others in their environment. Additionally, Table 8 reports positive correlations between sex and Self-Disclosure to Mother and to Female Peer, where it is seen that females share more personal information as compared to males.

A positive correlation between Rural/Urban residence and Socioeconomic Index was seen which indicates that persons resident in larger urban centres possess a higher socio-economic status.

Intercorrelations with Variable 9 (Locus of Control) suggest that individuals with an "internal" orientation are less neurotic and more accepting of self. Intercorrelations with Variable 10 (Extraversion) reveal the outgoing, gregarious and sociable individuals display a great willingness to disclose personal information to more persons than shy, and introverted persons.

Finally, an inverse relationship was seen to exist between neuroticism and self-acceptance indicating that persons scoring higher in emotional instability tend to be more self-deprecating and more dissatisfied with the self-as-perceived.

Tables 9 and 10 present the results of the T-tests conducted to determine whether the four groups (left-handed males; left-handed females; right-handed males; right-handed females) could be collapsed into two groups differentiated only by handedness.

It can be seen in Table 9 that left-handed males and females were

TABLE 9

T-tests for Significance of Difference Between Means
For Left-handed Males and Females

Variable	Left-Handed Males (N=21) Mean	S.D.	Left-Handed Females (N=22) Mean	S.D.	Degrees of Freedom	t' a	
Age	20.48	2.29	20.43	3.03	40.67	0.051	
Rural/Urban Residence	2.62	1.50	2.91	1.35	40.38	-0.682	
Birth Position	2.76	1.04	2.30	0.93	40.20	1.532	
Family Size	4.15	1.84	3.17	1.64	38.45	1.822	
Socioeconomic Index	50.57	17.61	53.73	15.07	39.59	-0.636	
I.Q.	119.4	8.7	115.7	7.5	39.65	1.497	
Locus of Control	8.14	3.69	11.83	3.81	41.84	-3.256	*
Extraversion	12.19	4.09	12.70	3.52	39.69	-0.437	
Neuroticism	11.00	3.99	11.61	3.90	41.46	-0.511	
Lie Scale	3.71	1.62	2.83	1.30	38.45	1.995	
Self-Acceptance	143.48	17.15	147.78	15.22	40.21	-0.878	
Self-Disclosure (Mother)	15.52	8.46	22.48	10.89	41.00	-2.377	*
Self-Disclosure (Father)	13.24	8.52	14.82	6.77	38.18	-0.671	
Self-Disclosure (Male Peer)	20.90	7.03	24.96	10.50	38.64	-1.515	
Self-Disclosure (Female Peer)	22.00	7.66	26.78	9.02	41.79	-1.901	
Self-Disclosure (Total)	70.29	27.50	88.09	24.34	39.86	-2.244	*

a T-values corrected for unequal variances: Welch's t' adjustment.

* $p < .05$

TABLE 10

T-tests for Significance of Difference Between Means
Right-handed Males and Females

Variable	Right-Handed Males (N=21) Mean	S.D.	Right-Handed Females (N=20) Mean	S.D.	Degrees of Freedom	t' a	
Age	20.48	2.29	19.65	1.27	31.48	1.436	
Rural/Urban Residence	3.14	1.28	2.20	1.28	38.89	2.360	*
Birth Position	2.05	0.92	2.50	1.32	33.82	-1.268	
Family Size	3.24	1.41	4.25	1.65	37.43	-2.106	*
Socioeconomic Index	61.21	11.63	48.46	15.36	35.40	2.988	* *
I.Q.	116.3	8.4	116.2	8.3	38.93	0.069	
Locus of Control	12.00	4.02	10.10	4.18	38.70	1.482	
Extraversion	12.52	2.75	12.50	4.03	33.34	0.022	
Neuroticism	10.57	4.60	11.55	4.87	38.56	-0.661	
Lie Scale	2.86	1.39	3.20	1.58	37.83	-0.738	
Self-Acceptance	140.90	16.86	143.05	19.63	37.49	-0.374	
Self-Disclosure (Mother)	16.71	6.71	22.50	8.52	36.11	-2.408	*
Self-Disclosure (Father)	13.19	6.55	13.85	7.78	37.21	-0.293	
Self-Disclosure (Male Peer)	22.29	6.37	24.15	9.49	33.00	-0.735	
Self-Disclosure (Female Peer)	23.76	9.52	29.65	5.35	31.80	-2.456	*
Self-Disclosure (Total)	73.33	21.88	87.15	25.42	37.53	-1.862	

a T-values corrected for unequal variances: Welch's t' adjustment

* $p < .05$

* * $p < .01$

found to differ significantly ($p < .05$) in each of three measures: Locus of Control, Self-Disclosure : Mother and Self-Disclosure: Total.

More specifically, left-handed males were found to be significantly more internal in their locus of control; left-handed females were found to be significantly more self-revealing to Mother and overall.

Table 10 has shown right-handed males to differ significantly from right-handed females in each of five variables: Rural/Urban Residence, Family Size, Socioeconomic Index, Self-Disclosure: Mother and Self-Disclosure: Female Peer. The right-handed males are seen to be resident in significantly larger urban centres, to be members of smaller families overall ($p < .05$); to possess a higher socio-economic index ($p < .01$). Additionally, females are again seen to be significantly more willing to disclose personal information to their mothers and to female peers ($p < .05$).

For each of the following variables, one-way analyses of variance have been conducted, differentiating by handedness: Acceptance of Self, Neuroticism, Extraversion, Age, Intelligence, Birth Position.

For each of the remaining variables, two-way analyses variance have been conducted, (sex by handedness): Self-Disclosure, Locus of Control, Rural/Urban Residence, Socioeconomic Index, Family Size.

The results of these analyses are discussed within the context of the five main hypotheses set out in Chapter IV.

Test of Hypotheses

Affective Differentiation

Hypothesis Number 1. It is hypothesized that left-handed individuals will score significantly lower in self-disclosure than right-handed individuals, as measured by a modified form of Jourard's Self-Disclosure Inventory.

It has been hypothesized that individuals exhibiting a higher level of affective differentiation would score lower overall on measure of self-disclosure than would individuals lower in affective differentiation. Table 11 presents the findings of the analysis of variance for the Total Self-Disclosure score.

Left-handed subjects were not found to differ significantly in their willingness to disclose personal information about themselves to significant others within their environment. A statistically significant sex difference was found in the extent to which females and males discuss personal information about themselves ($F=8.63$, $p<.01$). Both left and right-handed females were found to disclose more about themselves to each of: Mother, Father, Male Peer and Female Peer than did either of the left or right-handed male sample. This greater "openness" of females has been a consistent feature of Jourard's (1971a) work into self-disclosure.

Self-Acceptance

Hypothesis Number 2. It is hypothesized that left-handed individuals will score significantly higher in self-acceptance, as measured by Berger's Acceptance of Self Inventory, than right-handed individuals.

It was hypothesized that left-handed individuals would feel more of a sense of separate identity and more independence from others and that they would be more able to resist external influence. Important features of a sense of separate identity were defined as a competent and capable self, one which would be able to cope effectively with minimal support of others. Accordingly, it was hypothesized that this type of person would evidence a higher self-regard as a consequence. Table 12 presents the results of the analysis of variance of self-acceptance.

TABLE 11
Analysis of Variance of Self-Disclosure: Total

Source		df	MS	F	
Sex	(A)	1	0.527	8.63	*
Handedness	(B)	1	0.233	0.03	a
A x B		1	0.833	0.13	
Within		81	0.611		

* $p < .01$

a An F value of 3.96 needed for significance at $p < .05$ level

TABLE 12

Analysis of Variance of Self-Acceptance

Source	df	MS	F	
Groups	1	256.00	0.87	a
Error	82	293.70		

a An F value of 3.96 needed for significance at $p < .05$ level

Although the means in Table 7 reveal left-handed subjects to be higher in Self-Acceptance than right-handed test subjects, results in Table 12 indicate that this difference is not statistically significant (F=0.87, p<n.s.).

Extraversion

Hypothesis Number 3. It is hypothesized that left-handed individuals will score significantly lower in extraversion than right-handed individuals, as measured by the Eysenck Personality Inventory.

The third hypothesis predicted that left-handed persons would be less outgoing and less sociable than would right-hand persons. Table 13 reveals the results of the analysis of this hypothesis.

Table 13 indicates that left-handed and right-handed test subjects do not differ significantly in their degree of outgoingness and sociability (F=0.06, p<n.s.).

Locus of Control

Hypothesis Number 4. It is hypothesized that left-handed individuals will score significantly lower in externality than right-handed individuals, as measured by Rotter's Locus of Control (I-E) Scale.

It has been hypothesized that left-handed individuals should score significantly higher in the degree to which they feel themselves in control of their lives and in their resistance to external manipulation as measured by the Rotter I-E Scale. Table 14 presents the results of the analysis of this hypothesis.

As the table reveals, neither left nor right-handed groups were found to differ significantly in their locus of control (F=1.35, p< n.s.). Similarly, as a group, males were not found to differ significantly in their locus of control. However, a significant level of interaction was obtained (F=11.04, p<.01). An analysis of the Rotter mean scores

TABLE 13

Analysis of Variance of Extraversion

Source	df	MS	F	
Groups	1	0.73	0.06	a
Error	82	12.68		

a An F value of 3.96 needed for significance at $p < .05$ level

TABLE 14

Analysis of Variance of Locus of Control

Source		df	MS	F	
Sex	(A)	1	0.191	1.23	
Handedness	(B)	1	0.210	1.35	a
A x B		1	0.171	11.04	*
Within		81	0.174		

* $p < .01$

a An F value of 3.96 needed for significance at $p < .05$ level

on Internality-Externality would suggest that left-handed males consider themselves to be considerably more autonomous than do left-handed females, whereas right-handed males and females do not appear to differ appreciably in this regard.

Neuroticism

Hypothesis Number 5. It is hypothesized that left-handed individuals will score significantly lower than right-handed individuals in neuroticism, as measured by the Eysenck Personality Inventory.

The final hypothesis stated that there should be an inverse relationship found to exist between self-acceptance and emotional instability. Inasmuch as left-handers were anticipated to be higher in self-regard, they were expected to score lower in neuroticism and emotional lability.

Table 15 presents the results of the statistical analysis of this hypothesis. A statistically non-significant difference was recorded ($F=0.06$, $p <$ n.s.). Left-handed subjects and right-handed subjects have not been found to differ in the dimension of emotional stability.

Control Variables

An analysis of variance was conducted on each of the control variables to assess whether they would be found to exert any notable impact upon the manifestation of a handedness. Table 16 presents the data for each of the control variables: Age, Intelligence and Birth Position.

Table 16 reveals no statistically significant difference between the mean scores for left and right handers on each of the measures of age, intelligence and birth position.

For each of the control variables listed in Table 17, a significant

TABLE 15

Analysis of Variance of Neuroticism

Source	df	MS	F
Groups	1	1.11	0.06 a
Error	82	18.76	

a An F value of 3.96 needed for significance at $p < .05$ level

TABLE 16

One-Way Analyses of Variance of

Age, Intelligence and Birth Position

	Source	df	MS	F
Age	Groups	1	0.89	0.19
	Error	82	4.77	
I.Q.	Groups	1	32.00	0.46
	Error	82	69.17	
Birth Position	Groups	1	1.49	1.29
	Error	82	1.16	

TABLE 17

Two-Way Analyses of Variance of Rural/Urban Residence, Socioeconomic Index and Family Size

Source		df	MS	F	
Rural/Urban Residence					
Sex	(A)	1	0.255	1.38	
Handedness	(B)	1	0.102	0.05	
A x B		1	0.739	4.01	*
Within		81	0.190		
Socioeconomic Index					
Sex	(A)	1	0.517	2.25	
Handedness	(B)	1	0.170	0.74	
A x B		1	0.127	5.56	*
Within		81	0.242		
Family Size					
Sex	(A)	1	0.118	0.25	
Handedness	(B)	1	0.331	0.00	
A x B		1	0.119	2.66	
Within		81	0.457		

* $p < .05$

sex difference was found to occur when testing for homogeneity of variance, thus necessitating a two-way analysis of variance, sex by handedness.

As Table 17 reveals, no statistically significant difference was found between the mean scores for males and females, left and right handers on the variable measuring rural/urban residence. The significant interaction effect ($F=4.01$, $p < .05$) suggests that it is primarily the right-handed males who come from the largest urban centres obtaining a mean rating of 3.14 on the Rural/Urban index, in contrast to a mean rating of 2.20 for right-handed females, while left-handed males and females did not differ greatly, obtaining mean index scores of 2.62 and 2.91 respectively.

Although no significant relationship was found to exist between sex or handedness in socioeconomic status, the significant interaction effect ($F=5.56$, $p < .05$) is not unexpected as rural/urban residence and socioeconomic status have been shown to bear a relationship (Table 8). Right-handed males were found to come from the largest urban centres, and right-handed females from the more rural centres. Right-handed males are seen to possess the highest socioeconomic index, as measured by the Blishen (1967) index and right-handed females possess the lowest SEI rating of all four groups.

On the variable of family size, no relationship was found to exist with either sex or handedness.

Summary Statement

The results of the statistical analyses presented in this chapter

failed to support any of the five major hypotheses with respect to left and right-handedness. Left-handers, as a group, were not found to differ significantly from a corresponding group of right-handers in self-disclosure, self-acceptance, extraversion, neuroticism or locus of control. Moreover, neither group was found to differ significantly on any of the additional measures of age, intelligence, birth position, family size, rural/urban residence or socioeconomic index.

A statistically significant difference was recorded between males, as a total group, and females on the measure of self-disclosure, where females were found to be consistently more willing to disclose personal information to significant others than the males.

Finally, significant interaction effects were obtained between sex and handedness on each of the measures of Locus of Control, Rural/Urban Residence, and Socioeconomic Index.

CHAPTER VII

DISCUSSION

Integration of the Research Data

As was seen in Chapter VI, none of the main hypotheses were supported. Affective differentiation, as measured by the Self-Disclosure Inventory would not appear to be a relevant concept in assessing the personalities of left-handed and right-handed persons.

Several reasons can be presented, however, which may account for the present research findings. The first of these focusses upon the issue of whether the modified Jourard Self-Disclosure Inventory is a viable instrument in the assessment of affective differentiation. Although researchers have successfully employed this measure elsewhere in other cultures (Berry, 1967, 1971, 1974; Berry and Annis, 1974), it has not been sufficiently researched, nor does it possess firm empirical support as a gauge of socio-emotional differentiation within our North American society.

A second explanation for the findings is the possibility that the self-disclosure inventory in an attenuated form (20 items versus 60 in the original) insufficiently discriminates between the two groups. Examination of the mean scores for left-handers and right-handers (Table 7) revealed a somewhat lower, although non-significant score for the sinistrals. There is the possibility that the longer

original, more time-consuming version of the scale would have been a more sensitive instrument and would have produced a statistically significant difference between the two groups.

Finally, it could be proposed that the self-disclosure measure, as used in its present form, is a useful instrument for the measurement of affective differentiation, and that it has shown that there is no significant difference between sinistrals and dextrals in extent of self-disclosure, and in degree of differentiation.

Acceptance of the latter proposal has implications for the soundness of the theoretical base upon which this study has been founded. That is, that there is a cultural bias against the use of the left-hand and of the left-handed.

While Domhoff's (1969) research would provide support for the existence of the cultural bias in North American society, it could be concluded , if the latter proposal is to be accepted, that the impact of this bias does not appreciably affect the personality and psychological dynamics of the sinistral individual. Plausibly, the manifestation of left-handedness does not elicit either negative discriminatory nor prejudicial attitudes and further, may be an issue of relatively minor import in the daily lives of many sinistrals.

The findings of each of the additional measures, proposed as correlates of affective differentiation, all of which were nonsignificant, lends support to the contention that left and right handers may differ in few if any consistent ways, psychologically.

One novel aspect of the present study has been the inclusion of female subjects into the research design. An examination of the

mean values recorded on each of the main measures in Tables 9 and 10 reveals unexpected and contradictory results when the values of left-handed males are compared to right-handed males; and when the values for left-handed females are compared to right-handed females.

The mean values recorded on the measures Self-Disclosure, Acceptance of Self and Extraversion, are all lower for left-handed males versus right-handed males. Although statistically non-significant, they do reveal a trend which had been predicted in the hypotheses presented in Chapter IV. Clearly, the statistically significant mean difference for the left and right-handed males on the Locus of Control measure (left: 8.14, right: 12.00; df=40; t=-3.23; $p < .01$) indicates that the two male groups differ in at least one important dimension. The left-handed males can be considered unique in the extent to which they feel themselves as actively engaged in directing the course of events in their lives and in their ability to resist external manipulation and influence from other persons.

The mean values on each of the main measures for left-handed and right-handed females revealed that left-handers to be higher in each of the measures of Self-Disclosure, Acceptance of Self, Extraversion, and Locus of Control. With the exception of the measure Acceptance of Self, these findings were not anticipated by the researcher and are seen to run counter to those findings recorded for the male sample. These findings continue to raise some important questions regarding the soundness of the differentiation/cultural bias thesis. It would appear from the evidence presented that not only are the factors which separate left-handers from right-handers

complex, but they are further compounded by a significant sex difference which had not previously been identified.

In an attempt to provide a synthesis of the findings of this study, it becomes necessary firstly, to recognize the inadequacy of the concept of psychological differentiation in accounting for the personality differences between left and right-handed persons, and secondly to recognize that there may be two very different mechanisms involved in the personality dynamics of left-handed males and females.

The left-handed female, in contrast to her right-handed counterpart, is seen to be more willing to disclose personal information about herself, to be more self-accepting, to be more sociable and outgoing and to be more "externally" oriented in her locus of control. Additionally, left-handed females were found to be somewhat older, to come from larger urban centres, to possess a higher socioeconomic index and to be later born members in families of smaller size overall.

An explanation which proposes to account for these findings suggest that left-handed females in this study may be the products of a more favourable socio-emotional environment than right-handed subjects. Accepting the position that birth order, family size and social class have an impact upon the personality organization of the child, it may be that the manifestation of left-handedness in females is a visible indicator of an enlightened "laissez-faire" approach to child-rearing which has been prevalent during their formative years. That is, if it can be assumed that children born

later into families are less compelled to achieve and to excel in order to please their parents, and that parents in the middle and upper classes of society are less punitive in their child-rearing practices, then the result essentially is that a psychologically more healthy environment can be presumed to exist for the child. Left-handed females in this study were revealed to be equally self-disclosing to fathers and to be more disclosing to mothers than were right-handed females. It may be inferred that the left-handed females possess a closer and more trusting relationship with their parents than do right-handed females. Jourard and Lasakow (1958) and Jourard (1971a) have found a consistent relationship between parent cathexis and willingness to self-disclose between offspring and their parents. As a consequence, the left-handed female grows to become more outgoing, sociable, personally self-confident, gregarious, sensitive to others, and less achievement-oriented as compared to the right-handed female in this study.

For the left-handed males, the study has revealed that they occupy significantly higher birth positions, in families which are larger in size overall; that they come from smaller urban centres, and possess a significantly lower socioeconomic index than do right-handed males.

The impact of both social class, in addition to the greater emphasis that our society places upon personal achievement for males as opposed to females, may account in part for these findings.

Stein (1973) maintains that:

> the left-handed individual seems to experience more intense challenges to his sense of competence and autonomy than does the right-handed individual and seems, therefore, to respond with subtle but measurable, divergences in personality style (p. viii).

It may be seen that the left-handed male sample and the left-handed female sample are not directly comparable due to the discrepancies in rural/urban residence, social class and family size and that further, more rigorous investigation is required to assess the exact nature of sex difference in handedness in the development of personality styles for the left-handed.

Research Implications and Directions for Future Research

The findings of the present study have not supported a clear relationship between cultural bias and the development of differentiation in left-handed and right-handed individuals. However, socialization practices as they relate to the family environment are presumed to have played a role in several of the findings presented. Although left-handers and right-handers have been found to differ in several important dimensions, there is a great deal of question regarding whether one consistent personality style can be delineated for the sinistral individual. Rather, it is seen that many factors comprise a complex formula in determining the extent to which left-handedness will be reflected in personality dynamic of the individual. It is suggested that considerable work will be required to chart the exact nature of the sex differences in the development of personality for left-handed males and females.

Further development of a test instrument measuring affective

differentiation is required and its relationship to other measures of differentiation established.

Finally, an investigation of the parenting styles utilized by the parents of left-handed children would provide very useful information regarding whether a more democratic and emotionally supportive atmosphere does in fact exist.

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APPENDIX I

THE EDINBURGH HANDEDNESS INVENTORY

EHI

First Name _____ Phone Number _____

Age _____ Sex (Circle one) M F

Please indicate your preference in the use of hands in the following activities by putting + in the appropriate column. Where the preference is so strong that you would never try to use the other hand unless absolutely forced to put ++. If in any case you are really indifferent put + in both columns. Some of the activities require both hands. In these cases the part of the task, or object, for which hand preference is wanted is indicated in brackets. Please try to answer all the questions, and only leave a blank if you have no experience at all of the object or task.

	LEFT	RIGHT
1. Writing		
2. Drawing		
3. Throwing		
4. Scissors		
5. Toothbrush		
6. Knife (without fork)		
7. Spoon		
8. Broom (upper hand)		
9. Striking Match (match)		
10. Opening box (lid)		
i. Which foot do you prefer to kick with?		
ii. Which eye do you use when using only one?		

L.Q.		Leave these spaces blank	DECILE	

S

APPENDIX 2

ROTTER I-E SCALE

INSTRUCTIONS FOR THE I-E SCALE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each items consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief: obviously there are no right or wrong answers.

Your answers to the items on this inventory are to be recorded by circling the appropriate letter, either a or b for each question. Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every item. In some instances, you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks, one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try, some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experiences in life which determines what they're like.

9. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.
    b. This world is run by the few people in power and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.
    b. There is some good in everybody.

15. a. In my case, getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims or forces we can neither understand, nor control.
    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
    b. There really is no such thing as "luck".

19. a. One should always be willing to admit mistakes.
    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.
    b. How many friends you have depends on how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness or all three.

22. a. With enough effort we can wipe out political corruption.
    b. It is difficult for people to have much control over the things politicians do in the office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.
    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
    b. In the long run, the people are responsible for bad government on a national as well as on a local level.

APPENDIX 3

BERGER ACCEPTANCE OF SELF-SCALE

S-A SCALE

This is a study of some of your attitudes. Of course, there is no right answer for any statement. The best answer is what you feel is true for yourself. You are to respond to each question in the space provided by each item according to the following scheme:

1	2	3	4	5
Not at all true of myself	Slightly true of myself	About half-true of myself	Mostly true of myself	True of myself

Remember, the best answer is the one which applies to you.

_____ I'd like it if I could find someone who would tell me how to solve my personal problems.

_____ I don't question my worth as a person, even if I think others do.

_____ When people say nice things about me, I find it difficult to believe they really mean it. I think maybe they're kidding me or aren't being sincere.

_____ If there is any criticism or anyone says anything about me, I just can't take it.

_____ I don't say much at social affairs because I'm afraid that people will criticize me or laugh if I say the wrong thing.

_____ I realize that I'm not living very effectively but I just don't believe I've got it in me to use my energies in better ways.

_____ I look on most of the feelings and impulses I have toward people as being quite natural and acceptable.

_____ Something inside me just won't let me be satisfied with any job I've done -- if it turns out well, I get a very smug feeling that that this is beneath me, I shouldn't be satisfied with this, this isn't a fair test.

_____ I feel different from other people. I'd like to have the feeling of security that comes from knowing I'm not too different from others.

_____ I'm afraid for people that I like to find out what I'm really like, for fear they'd be disappointed in me.

_____ I am frequently bothered by feelings of inferiority.

_____ Because of other people, I haven't been able to achieve as much as I should have.

_____ I am quite shy and self-conscious in social situations.

_____ In order to get along and be liked, I tend to be what people expect me to be rather than anything else.

_____ I seem to have a real inner strength in handling things. I'm on a pretty solid foundation and it makes me pretty sure of myself.

_____ I feel self-conscious when I'm with people who have a superior position to mine in business or at school.

_____ I think I'm neurotic or something.

_____ Very often I don't try to be friendly with people because I think they won't like me.

_____ I feel that I'm a person of worth, on an equal plane with others.

_____ I can't avoid feeling guilty about the way I feel toward certain people in my life.

_____ I'm not afraid of meeting new people. I feel that I'm a worthwhile person and there's no reason they should dislike me.

_____ I sort of only half-believe in myself.

_____ I'm very sensitive. People say things and I have a tendency to think they're criticizing me or insulting me in some way and later I think of it, they may not have meant anything like that at all.

_____ I think I have certain abilities and other people say so too, but I wonder if I'm not giving them an importance way beyond what they deserve.

_____ I feel confident that I can do something about the problems that may arise in the future.

_____ I guess I put on a show to impress people. I know I'm not the person I pretend to be.

_____ I do not worry or condemn myself if other people pass judgement against me.

_____ I don't feel very normal, but I want to feel normal.

_____ When I'm in a group I usually don't say much for fear of saying the wrong thing.

_____ I have a tendency to sidestep my problems.

_____ Even when people do think well of me, I feel sort of guilty because I know I must be fooling them -- that if I were really to be myself, they wouldn't think well of me.

_____ I feel that I'm on the same level as other people and that helps to establish good relations with them.

_____ I feel that people are apt to react differently to me than they would normally react to other people.

_____ I live too much by other people's standards.

_____ When I have to address a group, I get self-conscious and have difficulty saying things well.

_____ If I didn't always have such hard luck, I'd accomplish much more than I have.

APPENDIX 4

JOURARD SELF-DISCLOSURE INVENTORY

S-DQ

INSTRUCTIONS

The questionnaire that you have been given has columns with the headings, "Mother", "Father", "Male Friend" and "Female Friend". You are to read each item on the questionnaire and then indicate in the appropriate boxes, the extent that you have talked about that item to each person, that is, the extent to which you have made yourself known to that person. Use the rating-scale that you see below to describe the extent that you have talked about each item.

RATING-SCALE

0: Have told the other person nothing about this aspect of me.

1: Have talked in general terms about this item. The other person has only a general idea about this aspect of me.

2: Have talked in full and complete detail about this item to the other person. He/she knows me fully in this respect and could describe me accurately.

X: Have lied or misrepresented myself to the other person so that he/she has a false picture of me.

	Mother	Father	Male Friend	Female Friend
1. How I wish I looked: my ideals for overall appearance.				
2. What it takes to get me feeling real depressed and blue.				
3. My feelings about different parts of my body - legs, hips, waist, weight, chest or bust, etc.				
4. My personal views on sexual morality- how I feel that I and others ought to behave in sexual matters.				
5. My personal views on drinking.				
6. What I think and feel about religion; my personal religious views.				

	Mother	Father	Male Friend	Female Friend
7. (a) For Males: My personal standards of beauty and attractiveness in women and what I consider to be attractive in a woman.				
(b) For Females: The things that I regard as desirable for a man to be - what I look for in a man.				
8. My feelings about my adequacy in sexual behavior - whether or not I feel able to perform adequately in sex-relationships.				
9. The aspects of my personality that I dislike, worrying about, that I regard as a handicap to me.				
10. Whether or not I feel that I am attractive to the opposite sex; my problems, if any, about getting favorable attention from the opposite sex.				
11. What it takes to get me feeling real worried, anxious and afraid.				
12. My feelings about the appearance of my face - things I don't like about my face and head - nose, eyes, hair, teeth, etc.				
13. What feelings, if any, that I have trouble expressing or controlling.				
14. What it takes to hurt my feelings deeply.				
15. The kinds of things that make me furious.				
16. Whether or not I now have any health problems, eg., trouble with sleep, digestion, female complaints, heart condition, allergies, headaches, piles, etc.				
17. The kind of things that make me especially proud of myself, elated, full of self-esteem or self-respect.				

Mother	Father	Male Friend	Female Friend

18. Things in the past or present that I am ashamed and guilty about.

19. My personal opinions and feelings about other religious groups than my own, eg., Protestants, Catholics, Jews, Atheists.

20. My personal views on soft drug use.

APPENDIX 5

PERSONAL DATA SHEET

PERSONAL DATA SHEET

You are requested to provide the following information which will assist in the statistical analysis of the data. This information is considered personal and confidential and will be held as such. You are asked to identify yourself by providing only your first name and devising a 4-digit code. Please write your first name and code number on each questionnaire you fill out.

Name (First) _____ Identification Code (utilize 4 digits) ____

Sex M____ F____

Age _____

Geographic residence of your family during your upbringing.

(Check One)

less than 5,000 population _____

5,000 - 50,000 _____

50,000 - 100,000 _____

100,000 + _____

Number of older siblings _____

Number of younger siblings _____

Occupation of head of your household _____

APPENDIX 6

SCORES OBTAINED BY ALL SUBJECTS ON 18 VARIABLES UNDER EXAMINATION

DESCRIPTION OF FOOTNOTES

a Laterality Quotient

b Rural/Urban Residence

c Birth Position

d Family Size

e Socioeconomic Index

f Locus of Control

g Extraversion

h Neuroticism

i Lie Scale

j Self-Acceptance

k Self-Disclosure

Subject	L.Q.[a]	Sex	Age	R/U[b]	B.P.[c]	F.S.[d]	SET[e]	I.Q.	I-E[f]	E[g]
1	+100	2	19	3	3	4	70.14	121	9	16
2	+100	2	19	2	2	3	76.01	112	15	14
3	+100	2	18	1	3	4	51.88	107	18	9
4	+100	2	20	2	2	4	39.55	118	6	2
5	+100	2	21	1	6	8	58.29	100	9	15
6	+100	2	18	1	3	3	35.05	111	4	6
7	+100	2	18	1	2	2	35.05	111	15	16
8	+100	2	20	1	4	4	35.05	123	8	9
9	+100	2	19	4	1	2	64.52	124	4	10
10	+100	2	19	3	4	5	29.71	112	9	18
11	+100	2	22	1	4	5	35.05	115	9	16
12	+100	2	21	3	2	3	59.60	128	16	10
13	+100	2	19	4	1	3	42.98	129	11	16
14	+100	2	20	2	1	4	72.87	121	4	17
15	+100	2	20	1	3	3	52.07	125	12	11
16	+100	2	18	4	3	6	46.95	122	15	12
17	+100	2	22	4	2	4	29.71	119	7	14
18	+100	2	21	1	1	5	35.05	117	9	12
19	+100	2	20	4	1	8	64.52	109	9	15
20	+100	2	19	1	2	5	35.05	100	13	12
21	-100	2	19	4	2	5	54.75	121	6	12
22	-100	2	21	1	5	11	35.05	109	12	14
23	-100	2	19	4	2	2	35.80	127	12	9
24	-100	2	19	4	2	3	63.75	121	5	19
25	-100	2	18	1	3	7	35.05	116	16	14
26	-100	2	21	3	2	5	57.82	106	15	13
27	- 87	2	22	4	1	1	76.01	133	15	13
28	- 80	2	20	4	2	2	68.80	112	9	17
29	- 73	2	29	1	1	1	28.22	120	12	13
30	- 73	2	19	4	3	3	59.91	104	5	14
31	- 71	2	18	2	2	2	46.95	118	9	5

Subject	L.Q.	Sex	Age	R/U	B.P.	F.S.	SEI	I.Q.	I-E	E
32	- 69	2	21	2	2	3	45.68	122	14	12
33	- 71	2	18	4	3	3	34.38	114	14	18
34	- 63	2	19	4	2	3	64.52	116	13	7
35	- 68	2	20	4	3	3	51.88	108	13	15
36	- 56	2	20	4	3	3	70.14	113	15	13
37	- 50	2	20	1	2	2	70.14	112	8	8
38	- 50	2	20	2	1	2	75.41	122	9	14
39	- 50	2	18	1	3	4	45.99	113	17	11
40	- 47	2	18	4	3	3	51.88	119	16	12
41	- 0	2	25	4	1	4	70.14	119	18	9
42	- 0	2	18	1	3	4	32.61	100	10	12
43	+100	1	19	4	3	4	70.14	126	17	8
44	+100	1	17	4	2	2	70.14	129	10	13
45	+100	1	21	1	1	6	70.14	116	6	11
46	+100	1	21	4	4	4	70.14	111	20	10
47	+100	1	19	4	2	3	61.75	126	13	8
48	+100	1	19	4	3	3	42.98	100	15	16
49	+100	1	21	1	2	12	35.05	121	17	11
50	+100	1	24	4	2	3	59.60	121	14	12
51	+100	1	19	4	2	4	53.85	123	14	13
52	+100	1	20	1	2	2	45.48	120	13	17
53	+100	1	24	1	1	3	54.74	117	10	12
54	+100	1	20	4	1	1	40.13	102	8	12
55	+100	1	18	4	2	3	72.87	118	9	14
56	+100	1	19	4	1	4	62.04	121	4	17
57	+100	1	18	2	1	2	70.14	108	8	9
58	+100	1	24	4	2	4	70.14	120	9	10
59	+100	1	24	2	2	2	58.29	100	14	17
60	+100	1	24	4	3	4	70.14	108	16	13
61	+100	1	18	2	4	5	70.14	118	12	12
62	+100	1	21	4	2	6	68.80	121	14	14
63	+ 90	1	20	4	1	1	68.80	118	9	14

Subject	L.Q.	Sex	Age	R/U	B.P.	F.S.	SEI	I.Q.	I-E	E
64	-100	1	19	4	2	4	70.14	112	7	16
65	-100	1	19	1	2	3	28.96	132	16	16
66	-100	1	19	1	2	2	31.86	117	6	15
67	-100	1	25	4	4	5	76.01	133	5	7
68	- 87	1	18	1	2	3	51.58	123	14	14
69	- 83	1	21	1	3	3	39.54	123	11	15
70	- 79	1	23	4	3	4	74.27	127	12	16
71	- 79	1	20	4	2	3	33.49	127	6	16
72	- 79	1	21	4	5	5	41.43	130	3	2
73	- 69	1	19	1	2	2	34.38	119	10	12
74	- 64	1	23	4	1	2	70.14	126	12	11
75	- 57	1	18	4	2	3	70.14	118	12	10
76	- 57	1	22	4	2	4	70.14	122	9	18
77	- 50	1	19	2	2	5	33.49	119	4	15
78	- 58	1	19	1	4	8	44.27	105	4	7
79	- 47	1	19	4	4	6	70.14	117	5	10
80	- 47	1	20	4	4	4	63.02	101	8	14
81	- 44	1	19	4	2	4	59.60	120	9	15
82	- 40	1	18	1	4	10	35.05	108	5	10
83	- 17	1	24	1	3	4	35.05	108	9	10
84	- 8	1	25	1	3	9	29.31	122	4	7

Subject	N [h]	L [i]	S-A [j]	S-D Mother	S-D Father	S-D Male Peer	S-D Female Peer	S-D [k] Total
1	17	1	139	26	14	34	29	103
2	18	2	139	21	21	22	22	86
3	19	2	120	12	4	5	28	49
4	9	1	147	14	9	27	33	83
5	6	5	160	35	25	31	36	127
6	8	1	163	20	6	35	33	94
7	19	3	122	17	20	15	32	84
8	8	2	156	28	10	26	23	87
9	9	1	150	32	19	39	33	123
10	4	4	160	29	16	19	32	96
11	10	1	142	20	8	32	27	87
12	11	1	145	25	21	20	35	101
13	6	4	151	17	14	22	21	74
14	11	3	146	30	20	17	33	100
15	8	1	173	13	6	17	19	55
16	17	1	88	10	3	4	22	39
17	13	0	154	18	16	24	26	84
18	10	6	138	34	30	35	33	132
19	19	3	114	4	2	18	23	47
20	9	2	154	25	13	21	33	92
21	12	4	139	32	17	39	23	111
22	8	3	157	23	17	14	25	83
23	9	3	148	22	12	14	17	65
24	7	2	169	11	8	20	24	63
25	12	1	147	16	9	30	18	73
26	10	3	136	39	15	38	38	130
27	11	1	160	11	8	23	30	72
28	5	4	169	34	29	26	35	124
29	16	1	156	13	17	34	28	92
30	10	1	158	25	25	29	35	114

Subject	N	L	S-A	S-D Mother	S-D Father	S-D Male Peer	S-D Female Peer	S-D Total
31	15	2	146	13	13	6	12	44
32	5	4	142	26	10	11	19	66
33	8	2	159	27	15	23	33	98
34	13	3	122	20	16	18	25	79
35	11	0	133	29	24	0	23	76
36	19	0	150	32	17	26	39	114
37	19	2	134	24	18	18	24	88
38	11	0	151	22	15	37	25	99
39	17	0	103	0	1	24	31	56
40	13	1	150	8	3	22	34	67
41	14	2	162	35	15	27	22	99
42	9	1	150	32	22	38	33	125
43	12	3	110	6	5	10	0	28
44	12	5	142	10	10	30	32	82
45	11	1	152	12	11	18	26	67
46	8	4	155	13	12	25	26	76
47	11	1	121	20	3	28	21	72
48	17	0	135	21	16	25	36	98
49	14	2	140	9	8	30	13	60
50	7	2	141	12	13	19	21	65
51	16	2	143	30	9	17	26	82
52	10	3	127	22	24	30	26	102
53	6	2	165	17	19	28	15	79
54	7	3	157	23	21	21	32	97
55	9	2	148	18	11	18	24	71
56	4	1	150	19	17	16	36	88
57	1	3	163	10	10	10	10	40
58	9	1	150	28	29	29	36	123
59	13	1	144	18	18	21	23	80
60	22	0	101	15	13	20	19	67

Subject	N	L	S-A	S-D Mother	S-D Father	S-D Male Peer	S-D Female Peer	S-D Total
61	12	0	121	9	9	20	9	47
62	12	0	138	7	4	19	27	57
63	9	3	156	11	15	13	20	59
64	12	3	142	32	27	23	25	130
65	15	2	130	23	1	32	29	89
66	8	2	142	12	10	16	23	61
67	4	3	147	3	12	14	15	44
68	9	0	158	9	9	17	13	48
69	12	1	149	18	23	26	21	88
70	15	2	136	18	24	37	37	116
71	11	2	143	4	4	21	16	45
72	9	6	142	14	12	11	16	53
73	5	5	167	25	13	21	17	76
74	11	3	141	15	15	21	30	81
75	17	2	93	8	7	23	30	68
76	8	3	156	8	17	26	22	73
77	15	2	143	17	23	13	24	77
78	12	2	154	20	12	22	23	77
79	5	5	168	2	2	7	13	24
80	10	1	151	17	17	16	17	74
81	16	3	157	29	31	23	33	116
82	8	3	132	8	11	17	17	53
83	18	1	112	5	4	12	12	33
84	11	6	150	18	4	20	8	50